MYRTACEAE-FEEDING PHYLINAE (HEMIPTERA: MIRIDAE) FROM AUSTRALIA: DESCRIPTION AND ANALYSIS OF PHYLOGENETIC AND HOST RELATIONSHIPS FOR A MONOPHYLETIC ASSEMBLAGE OF THREE NEW GENERA

RANDALL T. SCHUH

George Willett Curator,
Division of Invertebrate Zoology
American Museum of Natural History
(schuh@amnh.org)

CHRISTIANE WEIRAUCH

Associate Professor,
Department of Entomology
University of California at Riverside
(christiane.weirauch@ucr.edu)

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ABSTRACT

Three new genera and 25 new species of Myrtaceae-feeding Phylinae are described from Australia. A cladistic analysis of a broader cross section of Australian Phylinae indicates that these taxa all belong to a monophyletic group, on the basis of pretarsal and male genitalic structures. Line drawings are used to present information of male and female genitalic structures; scanning electron micrographs illustrate pretarsal, genitalic, and other morphology. Color digital habitus images are presented for the males and females of all species. Digital images from the field and of pressed specimens are presented for a broad cross section of host plants. The newly described taxa represent a portion of the species of Australian Phylinae known to feed on the Myrtaceae; the remaining Myrtaceae-feeding species belong to other lineages and are therefore excluded from this monograph. Twenty-three of the species are recorded only from southwestern Western Australia; two species are recorded from southeastern South Australia. All species breed on members of the subfamily Myrtoideae, tribes Chamelaucieae and Melaleuceae.

INTRODUCTION

This paper represents part of an ongoing effort to document the fauna of Miridae, or plant bugs, of Australia, including distributional patterns and associations with host plants. Although in the past this fauna has received only limited study (Carvalho and Gross, 1982; Malipatil, 1992), the nature of its actual diversity is beginning to take shape. Within the Phylini (Phylinae), a group with its greatest diversity in the Mediterranean-climate regions of the world, recent papers have documented well-defined associations with a variety of host lineages within Australia, the occurrence of both Indo-Australian (Schuh and Menard, in prep.) and Transantarctic distributional patterns (Weirauch and Schuh, in press), and radiation of Miridae in association with extreme floristic diversity in southwestern Australia (Weirauch, 2007; Soto and Weirauch, 2009; Schuh and Pedraza, 2010).

The present study details the phylogenetic species-level relationships, classification, and host-plant associations for a monophyletic group of Myrtaceae-feeding taxa that are part of a larger lineage within Phylini whose members are restricted to Australia. The genesis of the paper began with dissections of male genitalia of a comprehensive sample of Australian Phylinae (~ 250 morphospecies) by coauthor Weirauch during her tenure as a postdoctoral fellow funded by a NSF Planetary Biodiversity Inventories project for the study of Miridae. Those efforts allowed us to recognize the existence of unique endosomal types within certain Australian Phylinae. Further study revealed that not only was the endosoma distinctive, but that the parempodia and left paramere were also novel, permitting the recognition of a monophyletic taxon that we here refer to as the *Melaleucoides* genus group and that is restricted to host plants within two tribes of the family Myrtaceae: Myrtoideae.

TAXONOMIC MATERIALS AND METHODS

Unique specimen identifiers: During the course of this project matrix code labels were affixed to about 2350 specimens examined as a way to uniquely identify them; these codes are therefore referred to as "unique specimen identifiers" (USIs). The USI codes, e.g., AMNH_PBI 00094810, are composed of an institution and project code (AMNH_PBI) and a unique number (00094810). USI codes are included in locality data, figures, and captions. To reduce the amount of space occupied by the USIs in the material examined sections the prefix (AMNH_PBI) is omitted except for the holotypes.

All latitude-longitude data presented in the specimens examined sections are in degrees and decimal parts thereof; the vast majority of georeferences were obtained with a GPS device in the field. Altitude data are treated as metric.

Comments on descriptions: The descriptions in the present paper were generated from a matrix of character data using WinClada (Nixon, 2000) and then underwent

TABLE 1
Measurements of *Melaleucoides* genus group species

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
Harpagophylus agnew												
M (*N* = 3)	**Mean**	**2.49**	**1.62**	**0.13**	**0.29**	**0.31**	**0.40**	**0.57**	**0.79**	**0.42**	**0.30**	**0.74**
	St Dev	0.11	0.08	0.03	0.05	0.02	0.03	0.01	0.02	0.01	0.01	0.11
	Range	0.21	0.16	0.07	0.08	0.04	0.06	0.02	0.04	0.02	0.03	0.21
	Minimum	2.36	1.54	0.10	0.24	0.29	0.37	0.56	0.77	0.40	0.28	0.62
	Maximum	2.57	1.70	0.16	0.32	0.33	0.43	0.58	0.82	0.42	0.31	0.83
F (*N* = 3)	**Mean**	**2.41**	**1.61**	**0.17**	**0.31**	**0.30**	**0.36**	**0.54**	**0.80**	**0.40**	**0.30**	**0.90**
	St Dev	0.08	0.01	0.03	0.02	0.02	0.03	0.03	0.04	0.03	0.02	0.11
	Range	0.17	0.02	0.06	0.03	0.05	0.06	0.06	0.08	0.06	0.03	0.21
	Minimum	2.33	1.60	0.14	0.31	0.28	0.33	0.51	0.77	0.37	0.28	0.79
	Maximum	2.50	1.62	0.20	0.33	0.32	0.39	0.57	0.85	0.43	0.31	1.00
Harpagophylus calytrix												
M (*N* = 6)	**Mean**	**2.51**	**1.70**	**0.14**	**0.36**	**0.32**	**0.39**	**0.62**	**0.91**	**0.46**	**0.33**	**0.75**
	St Dev	0.10	0.09	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.01	0.06
	Range	0.23	0.23	0.07	0.05	0.06	0.06	0.04	0.14	0.06	0.03	0.17
	Minimum	2.40	1.59	0.10	0.34	0.29	0.35	0.60	0.82	0.43	0.32	0.65
	Maximum	2.63	1.82	0.16	0.39	0.35	0.41	0.64	0.96	0.48	0.35	0.82
F (*N* = 4)	**Mean**	**2.52**	**1.79**	**0.18**	**0.36**	**0.35**	**0.36**	**0.62**	**0.96**	**0.48**	**0.35**	**0.80**
	St Dev	0.07	0.05	0.02	0.02	0.01	0.02	0.02	0.04	0.01	0.01	0.02
	Range	0.13	0.11	0.05	0.04	0.01	0.05	0.05	0.09	0.03	0.03	0.05
	Minimum	2.45	1.73	0.15	0.34	0.34	0.33	0.60	0.91	0.47	0.33	0.77
	Maximum	2.58	1.83	0.20	0.37	0.36	0.38	0.64	1.00	0.50	0.36	0.82
Harpagophylus scholtzii												
M (*N* = 4)	**Mean**	**2.17**	**1.47**	**0.15**	**0.30**	**0.28**	**0.35**	**0.51**	**0.75**	**0.36**	**0.29**	**0.66**
	St Dev	0.09	0.07	0.05	0.01	0.01	0.02	0.03	0.04	0.01	0.01	0.02
	Range	0.20	0.14	0.10	0.03	0.01	0.05	0.07	0.09	0.02	0.03	0.04
	Minimum	2.10	1.43	0.12	0.29	0.27	0.32	0.47	0.71	0.35	0.28	0.64
	Maximum	2.30	1.57	0.22	0.32	0.29	0.37	0.54	0.80	0.37	0.31	0.68
F (*N* = 4)	**Mean**	**2.26**	**1.57**	**0.09**	**0.33**	**0.31**	**0.36**	**0.54**	**0.83**	**0.40**	**0.32**	**0.76**
	St Dev	0.16	0.13	0.03	0.03	0.03	0.02	0.01	0.03	0.02	0.02	0.05
	Range	0.38	0.32	0.08	0.08	0.06	0.05	0.01	0.08	0.05	0.04	0.12
	Minimum	2.06	1.40	0.06	0.30	0.27	0.34	0.53	0.78	0.37	0.29	0.71
	Maximum	2.43	1.72	0.13	0.37	0.33	0.39	0.54	0.86	0.42	0.34	0.83
Harpagophylus thryptomeni												
M (*N* = 3)	**Mean**	**2.23**	**1.47**	**0.14**	**0.29**	**0.26**	**0.36**	**0.51**	**0.73**	**0.37**	**0.29**	**0.69**
	St Dev	0.12	0.06	0.03	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.04
	Range	0.23	0.12	0.07	0.02	0.02	0.02	0.02	0.05	0.03	0.02	0.09
	Minimum	2.11	1.41	0.10	0.28	0.25	0.36	0.50	0.70	0.35	0.28	0.64
	Maximum	2.34	1.53	0.17	0.30	0.27	0.38	0.52	0.76	0.39	0.30	0.73
F (*N* = 5)	**Mean**	**2.36**	**1.60**	**0.18**	**0.30**	**0.28**	**0.38**	**0.54**	**0.77**	**0.37**	**0.31**	**0.75**
	St Dev	0.18	0.12	0.05	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.05
	Range	0.48	0.29	0.14	0.08	0.04	0.05	0.07	0.06	0.05	0.05	0.12
	Minimum	2.14	1.43	0.11	0.25	0.25	0.35	0.51	0.74	0.34	0.29	0.68
	Maximum	2.61	1.72	0.25	0.33	0.29	0.40	0.58	0.80	0.39	0.34	0.80
Harpagophylus verticordii												
M (*N* = 5)	**Mean**	**2.43**	**1.63**	**0.18**	**0.32**	**0.30**	**0.38**	**0.56**	**0.81**	**0.38**	**0.32**	**0.76**
	St Dev	0.09	0.09	0.06	0.02	0.02	0.02	0.01	0.04	0.03	0.01	0.05
	Range	0.20	0.24	0.16	0.06	0.04	0.07	0.04	0.09	0.07	0.04	0.12
	Minimum	2.34	1.53	0.13	0.29	0.28	0.35	0.54	0.77	0.34	0.30	0.71
	Maximum	2.54	1.77	0.29	0.34	0.32	0.41	0.58	0.86	0.42	0.34	0.83

TABLE 1
(Continued)

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
F (*N* = 5)	**Mean**	**2.54**	**1.72**	**0.17**	**0.35**	**0.31**	**0.40**	**0.58**	**0.86**	**0.43**	**0.33**	**0.86**
	St Dev	0.11	0.07	0.03	0.01	0.04	0.03	0.02	0.04	0.03	0.01	0.04
	Range	0.31	0.19	0.06	0.02	0.10	0.07	0.07	0.12	0.07	0.03	0.11
	Minimum	2.40	1.63	0.13	0.34	0.27	0.37	0.55	0.81	0.39	0.32	0.80
	Maximum	2.70	1.83	0.19	0.36	0.36	0.44	0.62	0.93	0.46	0.35	0.91
Thryptomenomiris kalbarri												
M (*N* = 4)	**Mean**	**2.48**	**1.72**	**0.16**	**0.35**	**0.32**	**0.38**	**0.57**	**0.82**	**0.40**	**0.30**	**0.82**
	St Dev	0.05	0.03	0.03	0.01	0.03	0.06	0.02	0.03	0.02	0.01	0.02
	Range	0.12	0.07	0.08	0.03	0.06	0.14	0.05	0.08	0.05	0.03	0.03
	Minimum	2.44	1.69	0.12	0.33	0.30	0.30	0.55	0.77	0.37	0.28	0.80
	Maximum	2.55	1.76	0.20	0.36	0.36	0.44	0.60	0.85	0.42	0.32	0.83
F (*N* = 4)	**Mean**	**2.66**	**1.81**	**0.21**	**0.34**	**0.31**	**0.42**	**0.59**	**0.84**	**0.42**	**0.33**	**0.97**
	St Dev	0.11	0.09	0.08	0.02	0.02	0.03	0.01	0.03	0.02	0.01	0.01
	Range	0.27	0.21	0.19	0.06	0.04	0.05	0.03	0.06	0.05	0.02	0.03
	Minimum	2.52	1.72	0.13	0.31	0.29	0.39	0.59	0.80	0.39	0.32	0.95
	Maximum	2.79	1.93	0.32	0.37	0.33	0.44	0.61	0.86	0.44	0.33	0.98
Thryptomenomiris yalgoo												
M (*N* = 5)	**Mean**	**2.65**	**1.82**	**0.17**	**0.37**	**0.33**	**0.40**	**0.59**	**0.88**	**0.45**	**0.30**	**0.83**
	St Dev	0.08	0.05	0.02	0.03	0.02	0.03	0.01	0.02	0.04	0.00	0.01
	Range	0.21	0.10	0.03	0.05	0.05	0.06	0.03	0.06	0.10	0.01	0.02
	Minimum	2.58	1.77	0.15	0.36	0.31	0.37	0.57	0.86	0.40	0.30	0.83
	Maximum	2.79	1.87	0.19	0.41	0.36	0.43	0.60	0.92	0.50	0.31	0.85
F (*N* = 5)	**Mean**	**2.77**	**1.91**	**0.20**	**0.39**	**0.34**	**0.40**	**0.61**	**0.90**	**0.45**	**0.33**	**0.95**
	St Dev	0.04	0.02	0.01	0.02	0.01	0.02	0.02	0.03	0.02	0.02	0.03
	Range	0.10	0.04	0.03	0.05	0.03	0.05	0.04	0.07	0.05	0.04	0.08
	Minimum	2.71	1.89	0.18	0.37	0.33	0.38	0.58	0.87	0.42	0.32	0.91
	Maximum	2.82	1.94	0.21	0.42	0.36	0.43	0.62	0.93	0.47	0.35	0.99
Melaleucoides akaina												
M (*N* = 4)	**Mean**	**2.36**	**1.63**	**0.18**	**0.35**	**0.31**	**0.32**	**0.54**	**0.79**	**0.38**	**0.27**	**0.75**
	St Dev	0.04	0.03	0.04	0.01	0.00	0.03	0.01	0.01	0.01	0.00	0.02
	Range	0.10	0.06	0.10	0.03	0.01	0.07	0.04	0.01	0.02	0.01	0.04
	Minimum	2.33	1.61	0.14	0.33	0.30	0.29	0.52	0.78	0.38	0.27	0.73
	Maximum	2.43	1.67	0.24	0.36	0.31	0.36	0.56	0.79	0.39	0.28	0.77
F (*N* = 4)	**Mean**	**2.61**	**1.79**	**0.18**	**0.37**	**0.32**	**0.40**	**0.55**	**0.85**	**0.41**	**0.31**	**0.90**
	St Dev	0.09	0.09	0.04	0.03	0.01	0.06	0.00	0.02	0.02	0.01	0.03
	Range	0.17	0.18	0.09	0.07	0.03	0.12	0.01	0.04	0.06	0.02	0.05
	Minimum	2.52	1.68	0.15	0.34	0.31	0.32	0.54	0.82	0.38	0.30	0.87
	Maximum	2.68	1.87	0.24	0.40	0.33	0.44	0.56	0.86	0.44	0.32	0.93
Melaleucoides annae												
M (*N* = 5)	**Mean**	**3.46**	**2.40**	**0.19**	**0.45**	**0.49**	**0.48**	**0.80**	**1.29**	**0.66**	**0.38**	**0.80**
	St Dev	0.08	0.05	0.03	0.02	0.01	0.06	0.01	0.06	0.02	0.01	0.05
	Range	0.21	0.11	0.07	0.06	0.04	0.14	0.03	0.14	0.05	0.03	0.13
	Minimum	3.35	2.34	0.15	0.42	0.48	0.41	0.79	1.20	0.64	0.36	0.72
	Maximum	3.56	2.46	0.22	0.48	0.52	0.56	0.82	1.34	0.69	0.39	0.85
F (*N* = 5)	**Mean**	**3.51**	**2.54**	**0.23**	**0.48**	**0.51**	**0.48**	**0.83**	**1.36**	**0.70**	**0.41**	**0.97**
	St Dev	0.14	0.06	0.02	0.03	0.03	0.08	0.03	0.01	0.02	0.04	0.16
	Range	0.33	0.14	0.05	0.07	0.08	0.20	0.07	0.03	0.05	0.10	0.40
	Minimum	3.33	2.47	0.20	0.44	0.46	0.35	0.79	1.33	0.69	0.37	0.68
	Maximum	3.67	2.61	0.25	0.51	0.53	0.55	0.86	1.37	0.73	0.47	1.09

TABLE 1
(Continued)

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
Melaleucoides beaufortiae												
M (*N* = 5)	**Mean**	**2.98**	**2.08**	**0.19**	**0.39**	**0.43**	**0.37**	**0.80**	**1.10**	**0.54**	**0.39**	**0.82**
	St Dev	0.09	0.09	0.06	0.05	0.03	0.03	0.04	0.03	0.02	0.03	0.07
	Range	0.26	0.25	0.14	0.11	0.07	0.09	0.10	0.09	0.04	0.09	0.15
	Minimum	2.85	1.94	0.12	0.34	0.40	0.32	0.75	1.05	0.51	0.34	0.75
	Maximum	3.11	2.19	0.27	0.45	0.48	0.41	0.86	1.13	0.55	0.44	0.90
F (*N* = 3)	**Mean**	**3.06**	**2.14**	**0.22**	**0.40**	**0.44**	**0.41**	**0.82**	**1.13**	**0.56**	**0.42**	**0.92**
	St Dev	0.07	0.15	0.04	0.05	0.03	0.07	0.04	0.05	0.03	0.02	0.05
	Range	0.16	0.38	0.09	0.11	0.06	0.18	0.10	0.14	0.07	0.04	0.13
	Minimum	2.96	1.99	0.18	0.36	0.42	0.30	0.77	1.06	0.54	0.39	0.86
	Maximum	3.13	2.37	0.27	0.47	0.48	0.48	0.87	1.20	0.61	0.43	1.00
Melaleucoides brevifoliae												
M (*N* = 5)	**Mean**	**3.41**	**2.42**	**0.20**	**0.46**	**0.46**	**0.48**	**0.87**	**1.29**	**0.65**	**0.44**	**0.97**
	St Dev	0.13	0.07	0.02	0.03	0.06	0.06	0.04	0.07	0.06	0.05	0.05
	Range	0.32	0.20	0.05	0.09	0.15	0.14	0.09	0.17	0.17	0.11	0.12
	Minimum	3.19	2.31	0.17	0.41	0.39	0.42	0.84	1.21	0.57	0.39	0.92
	Maximum	3.52	2.51	0.22	0.49	0.54	0.56	0.93	1.38	0.74	0.50	1.04
F (*N* = 5)	**Mean**	**3.70**	**2.57**	**0.23**	**0.48**	**0.52**	**0.53**	**0.92**	**1.36**	**0.69**	**0.51**	**1.07**
	St Dev	0.13	0.11	0.05	0.05	0.05	0.03	0.05	0.03	0.01	0.02	0.06
	Range	0.29	0.26	0.12	0.13	0.12	0.08	0.11	0.06	0.03	0.04	0.15
	Minimum	3.58	2.46	0.16	0.40	0.48	0.51	0.86	1.32	0.67	0.50	1.02
	Maximum	3.87	2.72	0.29	0.53	0.60	0.59	0.97	1.38	0.70	0.54	1.16
Melaleucoides cassisi												
M (*N* = 5)	**Mean**	**3.95**	**2.79**	**0.28**	**0.54**	**0.52**	**0.53**	**0.85**	**1.38**	**0.68**	**0.38**	**1.20**
	St Dev	0.11	0.10	0.03	0.02	0.03	0.06	0.03	0.04	0.04	0.02	0.09
	Range	0.26	0.27	0.07	0.04	0.07	0.15	0.07	0.12	0.08	0.05	0.23
	Minimum	3.78	2.63	0.25	0.52	0.48	0.43	0.82	1.32	0.65	0.35	1.04
	Maximum	4.05	2.90	0.32	0.56	0.55	0.58	0.89	1.44	0.73	0.41	1.28
F (*N* = 5)	**Mean**	**4.12**	**2.96**	**0.25**	**0.56**	**0.54**	**0.54**	**0.90**	**1.53**	**0.76**	**0.45**	**1.22**
	St Dev	0.17	0.05	0.04	0.02	0.08	0.08	0.02	0.02	0.02	0.03	0.11
	Range	0.39	0.13	0.11	0.06	0.20	0.21	0.05	0.05	0.06	0.08	0.27
	Minimum	3.86	2.89	0.21	0.52	0.41	0.42	0.88	1.50	0.73	0.41	1.05
	Maximum	4.26	3.02	0.32	0.58	0.61	0.63	0.93	1.55	0.79	0.49	1.33
Melaleucoides castanea												
M (*N* =1)	**Mean**	**3.61**	**2.39**	**0.17**	**0.47**	**0.54**	**0.62**	**1.03**	**1.44**	**0.75**	**0.58**	**1.00**
F (*N* = 3)	**Mean**	**3.84**	**2.69**	**0.22**	**0.52**	**0.59**	**0.53**	**1.12**	**1.55**	**0.82**	**0.60**	**0.92**
	St Dev	0.07	0.08	0.05	0.02	0.01	0.07	0.05	0.04	0.02	0.01	0.05
	Range	0.12	0.15	0.10	0.03	0.01	0.14	0.11	0.08	0.04	0.02	0.11
	Minimum	3.80	2.60	0.18	0.51	0.58	0.46	1.06	1.51	0.80	0.59	0.86
	Maximum	3.92	2.75	0.28	0.54	0.60	0.59	1.17	1.59	0.84	0.61	0.97
Melaleucoides grossi												
M (*N* = 4)	**Mean**	**3.34**	**2.46**	**0.17**	**0.43**	**0.51**	**0.50**	**0.92**	**1.38**	**0.70**	**0.41**	**0.94**
	St Dev	0.21	0.19	0.06	0.11	0.03	0.07	0.02	0.03	0.03	0.02	0.13
	Range	0.40	0.45	0.15	0.26	0.08	0.14	0.05	0.05	0.06	0.04	0.28
	Minimum	3.13	2.22	0.08	0.32	0.48	0.43	0.90	1.35	0.66	0.40	0.78
	Maximum	3.52	2.67	0.24	0.58	0.55	0.57	0.96	1.40	0.72	0.43	1.06
F (*N* = 4)	**Mean**	**3.75**	**2.74**	**0.24**	**0.54**	**0.52**	**0.54**	**0.92**	**1.46**	**0.72**	**0.45**	**1.03**
	St Dev	0.10	0.10	0.08	0.08	0.07	0.07	0.03	0.04	0.02	0.04	0.03
	Range	0.21	0.23	0.18	0.18	0.16	0.14	0.07	0.09	0.04	0.10	0.07
	Minimum	3.63	2.63	0.14	0.43	0.43	0.49	0.89	1.42	0.70	0.39	1.00
	Maximum	3.84	2.85	0.32	0.61	0.59	0.63	0.96	1.51	0.74	0.49	1.08

TABLE 1
(Continued)

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
Melaleucoides leuropomae												
M (*N* = 5)	**Mean**	**3.25**	**2.29**	**0.21**	**0.45**	**0.46**	**0.41**	**0.89**	**1.25**	**0.60**	**0.46**	**0.85**
	St Dev	0.10	0.06	0.02	0.03	0.02	0.04	0.03	0.03	0.02	0.02	0.05
	Range	0.23	0.15	0.06	0.07	0.06	0.08	0.08	0.09	0.06	0.06	0.14
	Minimum	3.11	2.22	0.19	0.42	0.42	0.37	0.85	1.20	0.57	0.43	0.79
	Maximum	3.34	2.36	0.25	0.48	0.48	0.45	0.92	1.29	0.63	0.49	0.93
F (*N* = 5)	**Mean**	**3.46**	**2.43**	**0.19**	**0.48**	**0.52**	**0.47**	**0.93**	**1.32**	**0.65**	**0.51**	**0.93**
	St Dev	0.09	0.08	0.02	0.02	0.03	0.03	0.06	0.03	0.04	0.04	0.05
	Range	0.25	0.21	0.06	0.06	0.07	0.07	0.15	0.08	0.10	0.08	0.13
	Minimum	3.35	2.34	0.15	0.44	0.50	0.44	0.85	1.30	0.60	0.47	0.88
	Maximum	3.60	2.55	0.21	0.50	0.57	0.50	1.01	1.38	0.70	0.54	1.01
Melaleucoides micranthae												
M (*N* = 5)	**Mean**	**3.14**	**2.24**	**0.21**	**0.39**	**0.46**	**0.44**	**0.82**	**1.22**	**0.63**	**0.42**	**0.91**
	St Dev	0.14	0.09	0.03	0.02	0.03	0.02	0.02	0.04	0.05	0.04	0.10
	Range	0.37	0.24	0.09	0.06	0.07	0.05	0.04	0.10	0.12	0.09	0.25
	Minimum	2.94	2.14	0.16	0.36	0.43	0.43	0.80	1.18	0.55	0.37	0.78
	Maximum	3.31	2.37	0.25	0.42	0.51	0.47	0.84	1.28	0.67	0.46	1.03
F (*N* = 5)	**Mean**	**3.53**	**2.45**	**0.21**	**0.46**	**0.50**	**0.48**	**0.94**	**1.16**	**0.56**	**0.50**	**1.12**
	St Dev	0.15	0.17	0.04	0.05	0.02	0.04	0.10	0.40	0.25	0.09	0.12
	Range	0.33	0.39	0.11	0.14	0.04	0.12	0.25	0.93	0.59	0.23	0.28
	Minimum	3.38	2.25	0.16	0.38	0.47	0.41	0.86	0.45	0.12	0.44	1.00
	Maximum	3.71	2.64	0.27	0.53	0.52	0.53	1.12	1.38	0.71	0.67	1.27
Melaleucoides ozzii												
M (*N* = 5)	**Mean**	**2.90**	**1.93**	**0.20**	**0.33**	**0.36**	**0.45**	**0.64**	**1.02**	**0.49**	**0.39**	**0.94**
	St Dev	0.10	0.08	0.03	0.03	0.02	0.04	0.03	0.03	0.02	0.05	0.03
	Range	0.27	0.20	0.07	0.09	0.05	0.09	0.07	0.06	0.06	0.14	0.07
	Minimum	2.74	1.86	0.17	0.30	0.34	0.41	0.61	1.00	0.46	0.30	0.91
	Maximum	3.01	2.06	0.24	0.38	0.38	0.50	0.67	1.06	0.52	0.44	0.98
F (*N* = 5)	**Mean**	**3.04**	**2.04**	**0.21**	**0.31**	**0.43**	**0.45**	**0.65**	**1.04**	**0.54**	**0.42**	**0.79**
	St Dev	0.12	0.07	0.05	0.02	0.06	0.05	0.01	0.06	0.05	0.02	0.18
	Range	0.30	0.17	0.12	0.04	0.15	0.13	0.03	0.17	0.13	0.04	0.43
	Minimum	2.90	1.95	0.15	0.29	0.36	0.41	0.64	0.93	0.47	0.40	0.57
	Maximum	3.20	2.12	0.27	0.33	0.51	0.54	0.66	1.10	0.60	0.44	1.00
Melaleucoides pileanthicola												
M (*N* = 5)	**Mean**	**2.72**	**1.90**	**0.20**	**0.41**	**0.35**	**0.38**	**0.62**	**0.97**	**0.48**	**0.33**	**0.90**
	St Dev	0.09	0.07	0.03	0.02	0.01	0.04	0.01	0.05	0.01	0.02	0.05
	Range	0.21	0.16	0.08	0.04	0.03	0.10	0.04	0.15	0.04	0.04	0.12
	Minimum	2.61	1.79	0.16	0.39	0.33	0.34	0.60	0.89	0.46	0.31	0.86
	Maximum	2.82	1.95	0.24	0.43	0.37	0.44	0.63	1.04	0.50	0.35	0.98
F (*N* = 5)	**Mean**	**2.94**	**2.03**	**0.20**	**0.43**	**0.37**	**0.41**	**0.63**	**1.01**	**0.50**	**0.35**	**0.97**
	St Dev	0.07	0.05	0.04	0.01	0.01	0.04	0.01	0.02	0.01	0.01	0.04
	Range	0.19	0.12	0.10	0.03	0.03	0.08	0.02	0.05	0.02	0.02	0.11
	Minimum	2.87	1.97	0.16	0.42	0.36	0.38	0.62	0.99	0.49	0.34	0.91
	Maximum	3.07	2.09	0.26	0.45	0.39	0.46	0.64	1.05	0.51	0.37	1.03
Melaleucoides rhaphiophyllae												
M (*N* = 3)	**Mean**	**2.87**	**2.13**	**0.17**	**0.40**	**0.46**	**0.40**	**0.84**	**1.22**	**0.61**	**0.44**	**0.99**
	St Dev	0.16	0.04	0.06	0.05	0.02	0.04	0.03	0.06	0.01	0.03	0.06
	Range	0.31	0.07	0.12	0.10	0.03	0.07	0.06	0.12	0.02	0.07	0.11
	Minimum	2.69	2.11	0.11	0.35	0.45	0.36	0.81	1.17	0.60	0.41	0.95
	Maximum	3.00	2.18	0.23	0.45	0.48	0.43	0.87	1.29	0.61	0.48	1.06

TABLE 1
(Continued)

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
F (*N* = 2)	**Mean**	**2.98**	**1.96**	**0.12**	**0.34**	**0.43**	**0.51**	**0.83**	**1.20**	**0.63**	**0.48**	**1.05**
	St Dev	0.15	0.12	0.02	0.04	0.04	0.02	0.03	0.05	0.03	0.04	0.07
	Range	0.21	0.17	0.03	0.06	0.05	0.03	0.05	0.07	0.04	0.05	0.09
	Minimum	2.87	1.87	0.10	0.31	0.40	0.50	0.80	1.17	0.60	0.45	1.00
	Maximum	3.08	2.04	0.13	0.37	0.45	0.53	0.85	1.24	0.65	0.50	1.10
Melaleucoides sheathianae												
M (*N* = 5)	**Mean**	**3.67**	**2.59**	**0.20**	**0.49**	**0.55**	**0.52**	**0.87**	**1.37**	**0.68**	**0.39**	**1.01**
	St Dev	0.15	0.16	0.05	0.05	0.01	0.05	0.03	0.04	0.04	0.03	0.10
	Range	0.31	0.35	0.12	0.12	0.03	0.14	0.06	0.11	0.09	0.07	0.27
	Minimum	3.50	2.39	0.14	0.43	0.53	0.45	0.85	1.31	0.64	0.35	0.89
	Maximum	3.80	2.74	0.27	0.55	0.56	0.59	0.90	1.42	0.73	0.42	1.16
F (*N* = 5)	**Mean**	**3.82**	**2.73**	**0.22**	**0.51**	**0.57**	**0.50**	**0.89**	**1.43**	**0.72**	**0.43**	**1.11**
	St Dev	0.28	0.09	0.03	0.04	0.03	0.09	0.03	0.09	0.03	0.02	0.05
	Range	0.71	0.24	0.07	0.09	0.08	0.22	0.07	0.23	0.09	0.06	0.11
	Minimum	3.49	2.63	0.18	0.48	0.53	0.39	0.86	1.31	0.68	0.40	1.05
	Maximum	4.21	2.86	0.25	0.57	0.62	0.61	0.94	1.53	0.77	0.46	1.16
Melaleucoides similis												
M (*N* = 4)	**Mean**	**3.38**	**2.24**	**0.23**	**0.34**	**0.40**	**0.59**	**0.69**	**1.11**	**0.53**	**0.35**	**0.88**
	St Dev	0.16	0.12	0.06	0.03	0.03	0.04	0.02	0.05	0.02	0.09	0.21
	Range	0.39	0.26	0.14	0.07	0.08	0.09	0.05	0.11	0.05	0.20	0.50
	Minimum	3.19	2.16	0.15	0.30	0.36	0.54	0.66	1.06	0.51	0.21	0.67
	Maximum	3.59	2.42	0.29	0.37	0.44	0.63	0.71	1.17	0.55	0.41	1.17
F (*N* = 1)	**Mean**	**3.11**	**2.10**	**0.13**	**0.37**	**0.43**	**0.46**	**0.66**	**1.08**	**0.52**	**0.38**	**0.94**
Melaleucoides systenae												
M (*N* = 5)	**Mean**	**3.23**	**2.34**	**0.24**	**0.47**	**0.48**	**0.42**	**0.84**	**1.22**	**0.70**	**0.44**	**0.84**
	St Dev	0.21	0.11	0.06	0.04	0.04	0.08	0.04	0.06	0.06	0.01	0.05
	Range	0.52	0.24	0.16	0.09	0.11	0.20	0.10	0.13	0.16	0.02	0.13
	Minimum	2.93	2.20	0.13	0.44	0.44	0.30	0.79	1.17	0.63	0.43	0.77
	Maximum	3.45	2.44	0.29	0.53	0.55	0.49	0.89	1.29	0.79	0.45	0.90
F (*N* = 5)	**Mean**	**3.51**	**2.48**	**0.25**	**0.47**	**0.47**	**0.47**	**0.80**	**1.32**	**0.71**	**0.44**	**0.85**
	St Dev	0.07	0.06	0.04	0.02	0.05	0.03	0.08	0.05	0.09	0.04	0.09
	Range	0.18	0.17	0.10	0.06	0.12	0.07	0.16	0.15	0.22	0.09	0.24
	Minimum	3.41	2.40	0.22	0.45	0.43	0.43	0.73	1.24	0.61	0.39	0.73
	Maximum	3.59	2.57	0.31	0.51	0.55	0.50	0.90	1.39	0.84	0.48	0.97
Melaleucoides uncinatae												
M (*N* = 5)	**Mean**	**2.99**	**2.25**	**0.19**	**0.41**	**0.52**	**0.35**	**0.76**	**1.25**	**0.69**	**0.40**	**1.07**
	St Dev	0.14	0.05	0.03	0.02	0.01	0.03	0.02	0.01	0.05	0.01	0.12
	Range	0.34	0.13	0.07	0.05	0.02	0.09	0.04	0.03	0.13	0.03	0.27
	Minimum	2.89	2.17	0.15	0.39	0.51	0.29	0.74	1.24	0.63	0.38	0.94
	Maximum	3.23	2.29	0.22	0.44	0.53	0.38	0.78	1.27	0.76	0.42	1.21
F (*N* = 5)	**Mean**	**3.26**	**2.39**	**0.21**	**0.46**	**0.53**	**0.39**	**0.80**	**1.34**	**0.70**	**0.45**	**1.12**
	St Dev	0.09	0.05	0.04	0.04	0.02	0.05	0.03	0.03	0.10	0.04	0.10
	Range	0.22	0.10	0.11	0.07	0.06	0.11	0.08	0.06	0.27	0.10	0.25
	Minimum	3.15	2.34	0.15	0.42	0.49	0.35	0.75	1.32	0.54	0.40	1.00
	Maximum	3.37	2.44	0.26	0.49	0.55	0.46	0.83	1.38	0.81	0.50	1.25
Melaleucoides undulatae												
M (*N* = 5)	**Mean**	**3.03**	**2.22**	**0.20**	**0.41**	**0.43**	**0.36**	**0.77**	**1.17**	**0.55**	**0.39**	**1.04**
	St Dev	0.16	0.10	0.03	0.03	0.04	0.07	0.02	0.04	0.03	0.02	0.07
	Range	0.40	0.23	0.07	0.07	0.08	0.20	0.05	0.10	0.08	0.06	0.16
	Minimum	2.81	2.11	0.17	0.39	0.39	0.24	0.73	1.13	0.50	0.36	0.96
	Maximum	3.21	2.34	0.24	0.46	0.47	0.44	0.78	1.23	0.58	0.42	1.12

TABLE 1
(Continued)

		Length						Width				
		Body	CunClyp	Head	Pron	Scut	Cun	Head	Pron	Scut	InterOc	AntSeg2
F (*N* = 5)	**Mean**	**3.27**	**2.26**	**0.19**	**0.42**	**0.48**	**0.50**	**0.80**	**1.25**	**0.61**	**0.46**	**1.09**
	St Dev	0.07	0.07	0.04	0.04	0.04	0.02	0.01	0.03	0.05	0.03	0.05
	Range	0.18	0.15	0.10	0.09	0.09	0.06	0.03	0.06	0.15	0.07	0.14
	Minimum	3.19	2.18	0.14	0.39	0.44	0.47	0.79	1.23	0.55	0.43	1.02
	Maximum	3.37	2.33	0.24	0.48	0.54	0.52	0.82	1.29	0.70	0.50	1.16
Melaleucoides verticordiae												
M (*N* = 5)	**Mean**	**3.49**	**2.39**	**0.26**	**0.43**	**0.48**	**0.51**	**0.74**	**1.19**	**0.72**	**0.39**	**1.13**
	St Dev	0.22	0.21	0.01	0.05	0.05	0.07	0.05	0.10	0.11	0.02	0.19
	Range	0.59	0.46	0.03	0.14	0.12	0.18	0.11	0.22	0.27	0.06	0.46
	Minimum	3.17	2.10	0.25	0.36	0.42	0.41	0.69	1.06	0.55	0.37	0.84
	Maximum	3.76	2.56	0.28	0.50	0.54	0.59	0.80	1.28	0.82	0.42	1.30
F (*N* = 5)	**Mean**	**3.59**	**2.53**	**0.30**	**0.43**	**0.46**	**0.48**	**0.75**	**1.24**	**0.63**	**0.46**	**1.28**
	St Dev	0.37	0.28	0.06	0.07	0.06	0.08	0.05	0.10	0.04	0.04	0.23
	Range	0.79	0.54	0.17	0.16	0.15	0.21	0.12	0.23	0.10	0.10	0.55
	Minimum	3.26	2.31	0.22	0.36	0.37	0.40	0.68	1.12	0.57	0.41	1.07
	Maximum	4.05	2.85	0.39	0.52	0.52	0.61	0.81	1.35	0.68	0.51	1.62

additional editing. Where size serves to help diagnose a taxon, we have included relevant measurement data in the diagnoses and descriptions. Detailed measurements for all species are presented in table 1.

Host-plant identifications: Hosts recorded in this study were pressed in the field and submitted as vouchers to the Western Australian Herbarium or the Royal Botanic Gardens, Sydney, for identification by botanical specialists. Thus, the identifications are authoritative and independent of our own predilections about the identities of the plant groups on which we were collecting. Host voucher numbers and/or locations are listed in the specimens examined sections.

Terminology for female genitalia: We have used the terminology *interramal sclerites* and *interramal lobes* for structures of the posterior wall in the female (figs. 6, 7, 11, 18, 25, 34), following the practice established for Orthotylinae by Schaffner and Schwartz (2008) and Forero (2008). Our use of both of these terms in Phylinae should be construed as descriptive in nature, because these structures may not be homologous with those in Orthotylinae.

Measurements: Measurements for all taxa are presented in table 1. Means for total length and pronotal width are presented in the descriptions. Measurements were made using a micrometer driven stage, with micrometer output being written directly to a spreadsheet.

Designation of paratypes: We designate as paratypes specimens that represent a confident association of material with the concept for the species and which were examined as part of the descriptive process.

Deposition of specimens and abbreviations for institutional depositories: Within Australia the collecting permitting process is reserved to the states. Following the stipulations of our permits (see Acknowledgments) holotypes are deposited in the states of origin. Depending on the conditions of the collecting permits, a subset of paratypes may also be deposited in the state or origin. The preponderance of the remaining material is lodged in the institutions that supported the fieldwork (Australian Museum, American Museum of Natural History), with a representative sample of specimens deposited in institutions participating in the Plant Bug Planetary Biodiversity Inventory Project or other institutions of record.

Institutional depositories for specimens utilized during the course of this study and their acronyms as used in this paper are as follows:

AM	Australian Museum, Sydney
AMNH	American Museum of Natural History, New York

ANIC	Australian National Insect Collection, CSIRO, Canberra
CNC	Canadian National Collection of Insects, Ottawa
SAMA	South Australian Museum, Adelaide
UCR	University of California, Riverside
UNSW	University of New South Wales, Sydney
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, DC
WAMP	Western Australian Museum, Perth
ZISP	Zoological Institute, Russian Academy of Sciences, St. Petersburg

Melaleucoides genus group

DIAGNOSIS: Recognized by fleshy lyriform parempodia (fig. 5C; character 23-1) and clawlike decurved apex of the right paramere (fig. 1; 61-0); other attributes found in the group include the dark spots at the bases of the tibial spines and the female genitalia with interramal sclerites and interramal lobes (fig. 6). The group is also diagnosed by the weakly arcuate and dorsally curving primary endosomal strap of the male genitalia (fig. 1; character 30-1) and the presence of a spinelike elongate process near the gonopore on the ventral surface of the endosoma that is recurved toward the base of the endosoma (fig. 1; 37-2), although these attributes do not occur in all species.

DISCUSSION: Lyriform parempodia occur in all species in the *Melaleucoides* genus group, whereas other Phylini in Australia and elsewhere possess setiform parempodia. Most species in the group possess the clawlike apex of the right paramere, but based on our observations and cladistic analyses, this character is secondarily modified in several species within the group.

KEY TO *MELALEUCOIDES* GENUS GROUP GENERA

1. Right paramere greatly elongate, reaching across entire width of pygophore in repose (fig. 5F), with apex in the shape of a claw; left paramere not greatly elongate in dorsoventral perspective, covering about half of height of pygophore in lateral view (fig. 5D), with posterior process very long and curving ventrally (figs. 1–3); endosoma always with 2 appendages in region of secondary gonopore . . . . . *Harpagophylus*

– Right paramere short, broadly lanceolate, not traversing entire width of pygophore in repose (figs. 8F, 9, 12F, 17F, 19); posterior process of left paramere relatively short, never strongly curving toward venter . . . 2

2. Left paramere elongate in dorsoventral perspective, flattened, spoon shaped, and erect (figs. 12D, E, 13, 17E, 19, 23, 24E); apex of left paramere sometimes elongate . . . . . *Melaleucoides*

– Left paramere more quadrate, not erect and spoon shaped as above, always with apex elongate (figs. 7, 8E, F, 9), reaching across pygophore in repose (fig. 8F) . . . . . *Thryptomenomiris*

Harpagophylus, new genus
Figures 1–6, 35–37; map 1; plate 1

TYPE SPECIES: *Harpagophylus verticordii*, new species.

DIAGNOSIS: Recognized within the *Melaleucoides* genus group by the unique, greatly elongate right paramere with a bulbous base (60-2) and the long, decurved posterior process of the left paramere (58-3) (figs. 1–6); size small, total length 2.10–2.63. Potentially confused with *Thryptomenomiris*, and small species of *Melaleucoides* on the basis of small size and association with the Myrtaceae. The structure of the parameres in *Harpagophylus* precludes any confusion with these other groups, however.

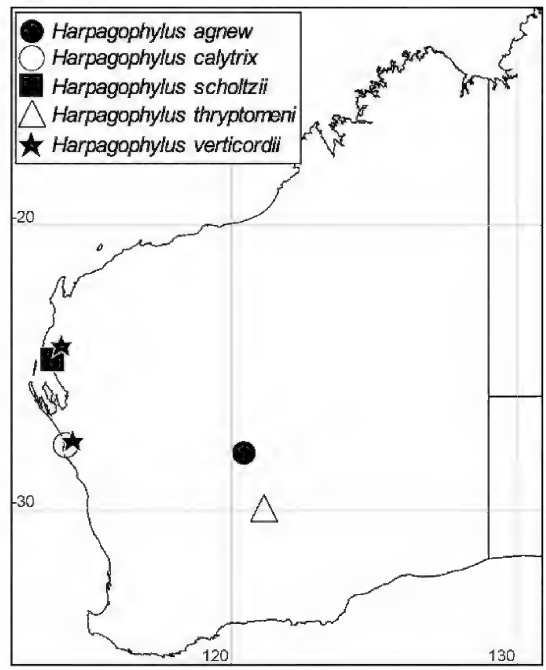
DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, total length 2.10–2.63, width pronotum 0.70–0.96. COLORATION (pl. 1): Pale, with or without reddish areas on dorsum. SURFACE AND VESTITURE (fig. 5B): Dorsum with reclining simple setae matching background coloration and with some sericeous or woolly setae. STRUCTURE: **Head** (fig. 5A): Somewhat projecting; interocular space relatively large; eyes leaving gena moderately exposed in lateral view. **Thorax**: *Pretarsus* (fig. 5C): Parempodia fleshy, recurved, lyriform; pulvilli absent. GENITALIA (figs. 1–6): **Endosoma**: Base short, curving, C- or J-shaped;

body without torsion, primary strap ventral to secondary gonopore, apically greatly elongate, nearly straight, angled relative to body of endosoma, without ornamentation; spinelike, elongate process present near gonopore on dorsal surface, erect, unornamented; spinelike, elongate process present near gonopore on ventral surface, recurved toward base of endosoma; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: Nearly erect, apical region of variable structure. **Left paramere** (fig. 5E): Horizontal; shaft at right angles to body; in dorsal perspective just exceeding margin of pygophore; in lateral perspective covering limited extent of lateral surface of pygophore; body narrowed toward apex; apex medially angulate, posterolaterally simple; anterior process in lateral view varying from triangular to undeveloped; posterior process very long, curving 90° toward base of paramere; base of posterior process without conspicuous shoulder. **Right Paramere** (fig. 5F): Body greatly elongate, bulbous at base; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; small, total length 2.06–2.70, width pronotum 0.74–1.00. COLORATION (pl. 1): As in male. GENITALIA (fig. 6): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; interramal lobes present, roughly symmetrical, erect, and not ornamented with spicules or with very few; vestibulum with medial plates weakly sclerotized or apparently absent, with caplike sclerotized guide with internal differentiation.

ETYMOLOGY: Named for the hooklike form of the right paramere; from the Latin *harpago*, "grappling hook," in combination with *Phylus*; gender masculine.

DISCUSSION: The five new species described below as belonging to the genus *Harpagophylus* are well supported as a monophyletic group in both the equal weights and the implied weights analyses (figs. 35, 36). Based on overall appearance and their association with Myrtaceae in the tribe Chamelaucieae, they are easily confused with species of *Thryptomenomiris*, new genus, and the small species within *Melaleucoides*, new genus. The structure of the left and right parameres clearly distinguishes them from other members in the *Melaleucoides* genus group.



Map 1. Localities for species of *Harpagophylus*.

KEY TO SPECIES OF *HARPAGOPHYLUS*

1. Dorsum with conspicuous red areas, particularly posterior half of endocorium (pl. 1); apex of phallotheca complex, body of endosoma broad (fig. 2). . . . . *Harpagophylus calytrix*
– Dorsum lacking conspicuous red areas, mostly yellow (pl. 1); apex of phallotheca without such complex ornamentation and body of endosoma relatively slender 2
2. Left side of pygophoral opening bearing a distinct clawlike appendage (fig. 4) . . . . . *Harpagophylus thryptomeni*
– Left side of pygophoral opening without a distinct clawlike appendage 3
3. Endosoma with both processes in region of secondary gonopore very long and recurved toward its base (fig. 6); apex of right paramere very long. . . . . *Harpagophylus verticordii*
– Endosoma with at least one process near secondary gonopore erect, perpendicular to axis (figs. 1, 3); apex of right paramere not so long. 4
4. Dorsal process of endosoma near secondary gonopore longer than ventral process (fig. 1);

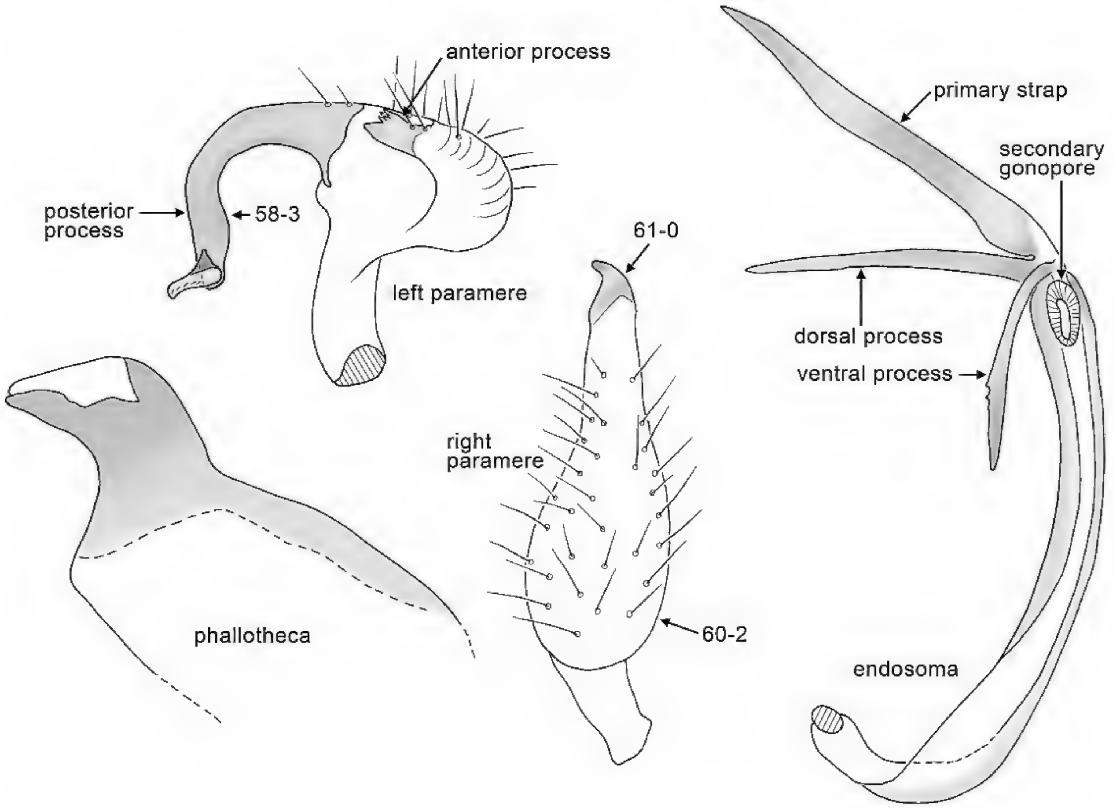


Fig. 1. *Harpagophylus agnew*, male genitalia (AMNH_PBI 00373245).

ventral process with a serrate margin (fig. 1) . . . . . *Harpagophylus agnew*

– Dorsal process of endosoma near secondary gonopore shorter than ventral process (fig. 1); ventral process with a simple margin (fig. 3) . . . . . *Harpagophylus scholtzii*

Harpagophylus agnew, new species
Figure 1, map 1, plate 1

DIAGNOSIS: Recognized by the pale, yellowish coloration, the endosomal processes both long, straight, and erect, the simple apex of the phallotheca, the long, relatively slender right paramere, and the denticulate anterior process on the left paramere. Most easily confused with *H. scholtzii*, *H. thryptomeni*, and *H. verticordii* on the basis of pale coloration, but those species all differing in the structure of the anterior process of the left paramere, the conformation of the right paramere, the structure of the apex of the phallotheca, and the conformation of the dorsal and ventral endosomal processes.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, mean total length 2.49, mean width pronotum 0.79. COLORATION (pl. 1): **Head**: Uniformly pale, yellow; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum scutellum, and hemelytron unicolorous pale, yellow; markings on cuneus absent; membrane very weakly fumose, veins; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with reclining simple setae matching background coloration and some sericeous or woolly setae. STRUCTURE: **Head**: Barely projecting; interocular space moderate; eyes leaving gena only very slightly exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygo-

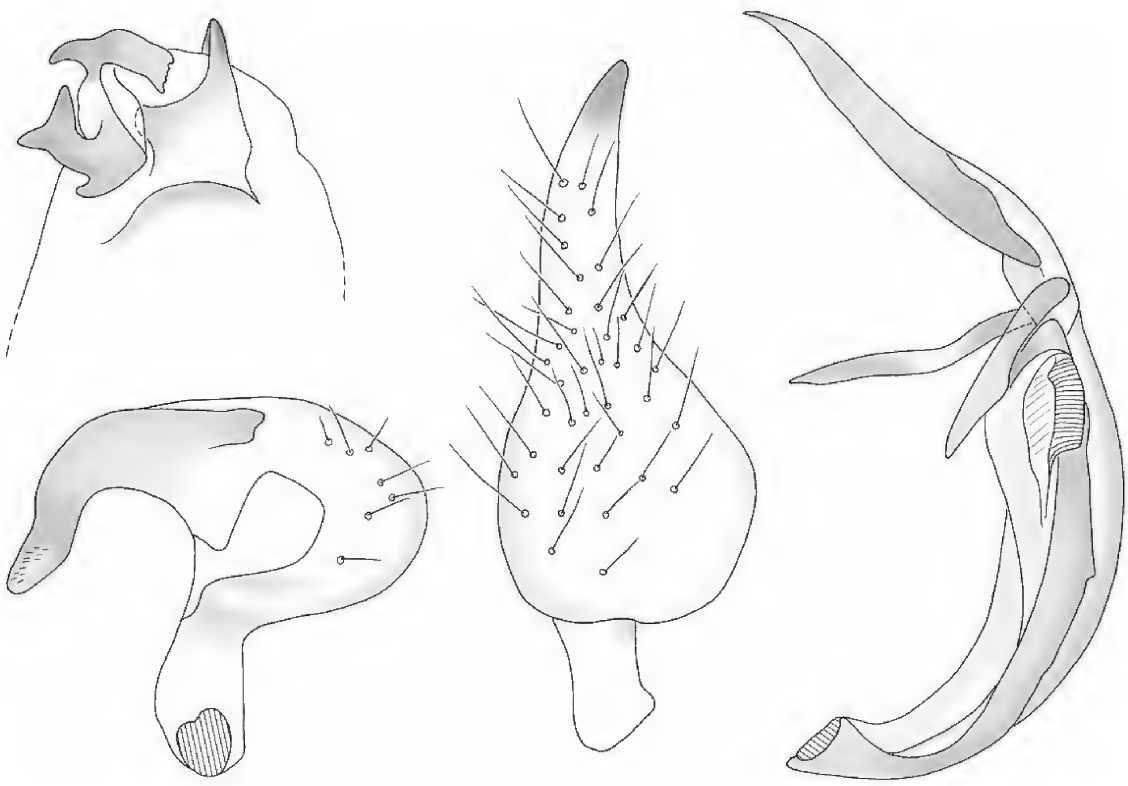


Fig. 2. *Harpagophylus calytrix*, male genitalia (AMNH_PBI 00134821).

phore. GENITALIA (fig. 1): **Phallotheca**: More or less right angulate; dorsal surface without a fingerlike projection, and without a platelike projection; anterior surface without a keel; ventral surface without a projecting keel; apex simple.

Female: Slightly more ovoid than male; small, mean total length 2.41, mean width pronotum 0.80. COLORATION (pl. 1): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the town of Agnew, Western Australia, near the type locality; a noun in apposition.

HOSTS (table 2): *Thryptomene aspera glabra* E. Pritz. (Myrtaceae).

DISTRIBUTION (map 1): Known only from the type locality in the Goldfields region of Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 31.7 km W of Agnew toward Sandstone, 27.96227°S 120.4277°E, 800 m, 26 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), PERTH 05095190, 1♂ (AMNH_PBI 00136500) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 31.7 km W of Agnew toward Sandstone, 27.96227°S 120.4277°E, 800 m, 26 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05095190, 3♂ (00373242–00373244), 5♀ (00373246–00373250) (AM), 3♂ (00136499, 00136501, 00373245), 4♀ (00136502, 00136504, 00136506–00136507) (AMNH), 4♀ (00373251–00373254) (WAMP).

Harpagophylus calytrix, new species
Figure 2, map 1, plate 1

DIAGNOSIS: Recognized by the heavily reddish coloration on much of the dorsum, the absence of a developed anterior process on the left paramere, the complex structure of apex of phallotheca, and the broad body of the endosoma. All other species of *Harpagophylus* are pale in coloration, with differing structures on the apex of the phallotheca, and with the body of the endosoma not so robust.

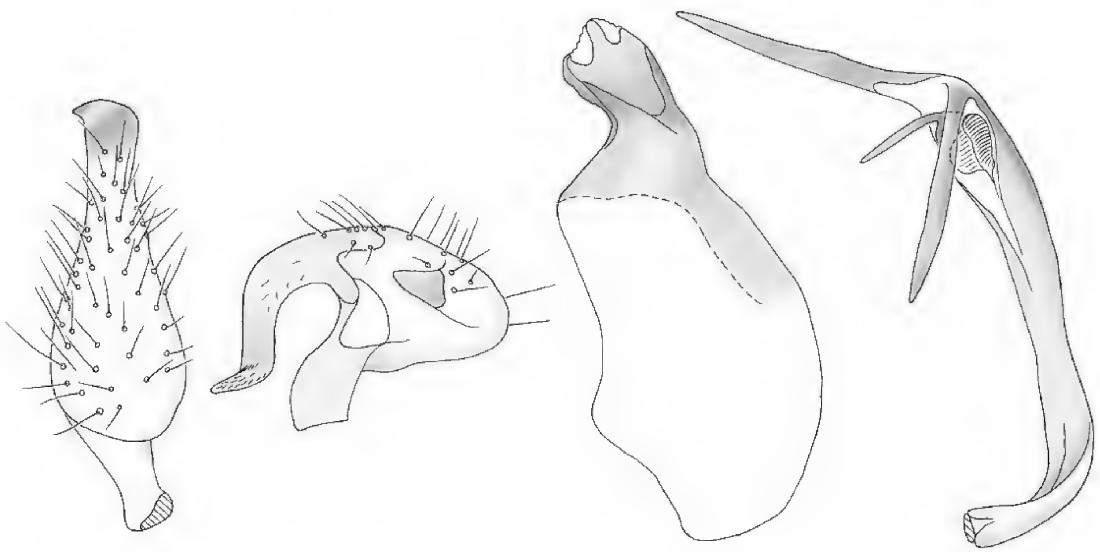


Fig. 3. *Harpagophylus scholtzii*, male genitalia (AMNH_PBI 00327137).

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; small, mean total length 2.51, mean width pronotum 0.91. COLORATION (pl. 1): **Head**: Uniformly dark, reddish; scapus unicolorous dark; pedicellus black at extreme base, remainder pale; labium generally infuscate, heavily so apically. **Thorax**: Pronotum and scutellum unicolorous red to brown; hemelytron partially pale with red or carmine areas, especially on clavus along scutellum and on endocorium; cuneus transparent, without markings; membrane and veins strongly fumose; hind femur nearly unicolorous dark; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous dark. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head**: Somewhat projecting; interocular space relatively large; eyes leaving gena only very slightly exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. GENITALIA (fig. 2): **Phallotheca**: Nearly erect; apex complex.

Female: Slightly more ovoid than male; small, mean total length 2.51, mean width pronotum 0.96. COLORATION (pl. 1): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host genus, *Calytrix* (Myrtaceae); a noun in apposition.

HOSTS: *Calytrix variabilis* Lindl. (Myrtaceae) (pl. 5A).

DISTRIBUTION (map 1): Known only from the type locality in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Kalbarri National Park, Meanarra Hill, 27.69228°S 114.2104°E, 200 m, 29 Oct 1996, Schuh and Cassis, *Calytrix variabilis* Lindl. (Myrtaceae), det. Perth 05120470, 1♂ (AMNH_PBI 0134818) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** Kalbarri National Park, Meanarra Hill, 27.69228°S 114.2104°E, 200 m, 29 Oct 1996, Schuh and Cassis, *Calytrix variabilis* Lindl. (Myrtaceae), det. Perth 05120470, 2♂ (00134820, 00134821), 1♀ (00134826) (AM), 2♂ (00134822, 00134823), 2♀ (00134824, 00134825) (AMNH), 1♂ (00134819), 1♀ (00134827) (WAMP).

Harpagophylus scholtzii, new species
Figure 3, map 1, plate 1

DIAGNOSIS: Recognized by the pale, yellowish coloration, the endosomal processes both straight and erect, the dorsal process short, the ventral process much longer, the relatively short right paramere, and the triangular anterior process on the left paramere. Most easily confused with *H. agnew*, *H. thryptomeni*, and

H. verticordii on the basis of the pale coloration, but those species differing from *H. scholtzii* in the structure and conformation of the dorsal and ventral endosomal processes.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, mean total length 2.17, mean width pronotum 0.75. COLORATION (pl. 1): **Head**: Uniformly pale yellow; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum, scutellum, and hemelytron unicolorous pale yellow; markings on cuneus absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with reclining simple setae matching background coloration and some sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space relatively large; eyes leaving gena only very slightly exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. GENITALIA (fig. 3): **Phallotheca**: Nearly erect; dorsal surface without a fingerlike projection; apex complex.

Female: Slightly more ovoid than male; small, mean total length 2.26, mean width pronotum 0.83. COLORATION (pl. 1): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host genus, *Scholtzia* (Myrtaceae); a noun in apposition.

HOSTS: *Scholtzia leptantha* Benth. (Myrtaceae).

DISTRIBUTION (map 1): Known from one locality in the Carnarvon region of Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Scholtzia leptantha* Benth. (Myrtaceae), det. Perth6988687, 1♂ (AMNH_PBI 00327134) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Scholtzia leptantha* Benth. (Myrtaceae), det. Perth 6988687, 1♂ (00327135), 1♀ (0032-7140) (AM), 2♂ (00327136, 00327137), 2♀ (00327138, 00327139) (AMNH), 1♀ (0032-7141) (WAMP).

Harpagophylus thryptomeni, new species
Figure 4, map 1, plate 1

DIAGNOSIS: Recognized by the pale yellowish coloration, and uniquely by the clawlike appendage on the left side of pygophoral opening (fig. 4) and the projecting hook on the apex of the phallotheca. Most easily confused with *H. agnew*, *H. scholtzii*, and *H. verticordii* on the basis of pale coloration, but those species all lacking the hook on the pygophoral opening and also showing differences in the structure of the anterior process of the left paramere, the conformation of the right paramere, and the conformation of the dorsal and ventral endosomal processes.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, mean total length 2.23, mean width pronotum 0.73. COLORATION (pl. 1): **Head**: Uniformly yellow-orange; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum, scutellum, and hemelytron unicolorous yellow-orange; markings on cuneus absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with reclining simple setae matching background coloration and some sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. GENITALIA (fig. 4): **Phallotheca**: Nearly erect; dorsal surface without ornamentation; anterior and ventral surfaces without a keel; apex complex.

Female: Slightly more ovoid than male; small, mean total length 2.36, mean width

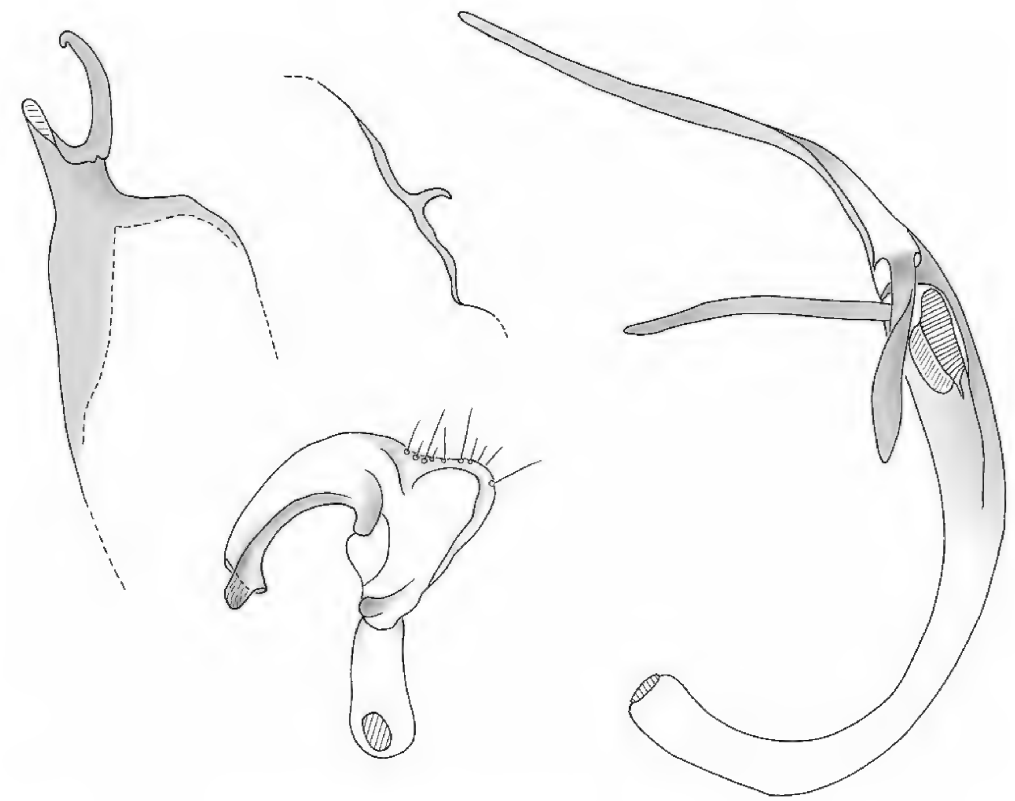


Fig. 4. *Harpagophylus thryptomeni*, male genitalia (AMNH_PBI 00373228).

pronotum 0.77. COLORATION (pl. 1): As in male. GENITALIA: As in generic description.

ETYMOLOGY: Named for the host genus, *Thryptomene* (Myrtaceae); a noun in apposition.

HOSTS: *Thryptomene aspera glabra* E. Pritz. (Myrtaceae).

DISTRIBUTION (map 1): Known from one locality in the Goldfields-Esperance region in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 28 km S of Menzies (3.5 km E of Hiway), 29.91917°S 121.1514°E, 500 m, 25 Oct 1996, Schuh and Cassis, *Thryptomene aspera aspera* E. Pritz. (Myrtaceae), det. Perth 05095093, 1♂ (AMNH_PBI 00372759) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 28 km S of Menzies (3.5 km E of Hiway), 29.91917°S 121.1514°E, 500 m, 25 Oct 1996, Schuh and Cassis, *Thryptomene aspera aspera* E.Pritz. (Myrtaceae), det. Perth 05095093, 1♂ (00373227), 8♀ (00373233–00373240) (AM), 3♂ (00372760–00372761, 00373228), 6♀ (00372762–00372766, 00373241) (AMNH), 4♀ (00373229–00373232) (WAMP).

Harpagophylus verticordii, new species
Figures 5, 6; map 1; plate 1

DIAGNOSIS: Recognized by the pale, yellowish, coloration, and the conformation of the endosomal processes, both long, curving, and recurved toward the base of the endosoma. Most easily confused with *H. agnew*, *H. scholtzii*, and *H. thryptomeni* on the basis of pale coloration, but *H. verticordii* differing from all of those species in the structure and conformation of the dorsal and ventral endosomal processes.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, mean total length 2.43, mean width pronotum 0.81. COLORATION (pl. 1): **Head**: Uniformly pale; scapus unicolorous pale; pedicellus unicolorous

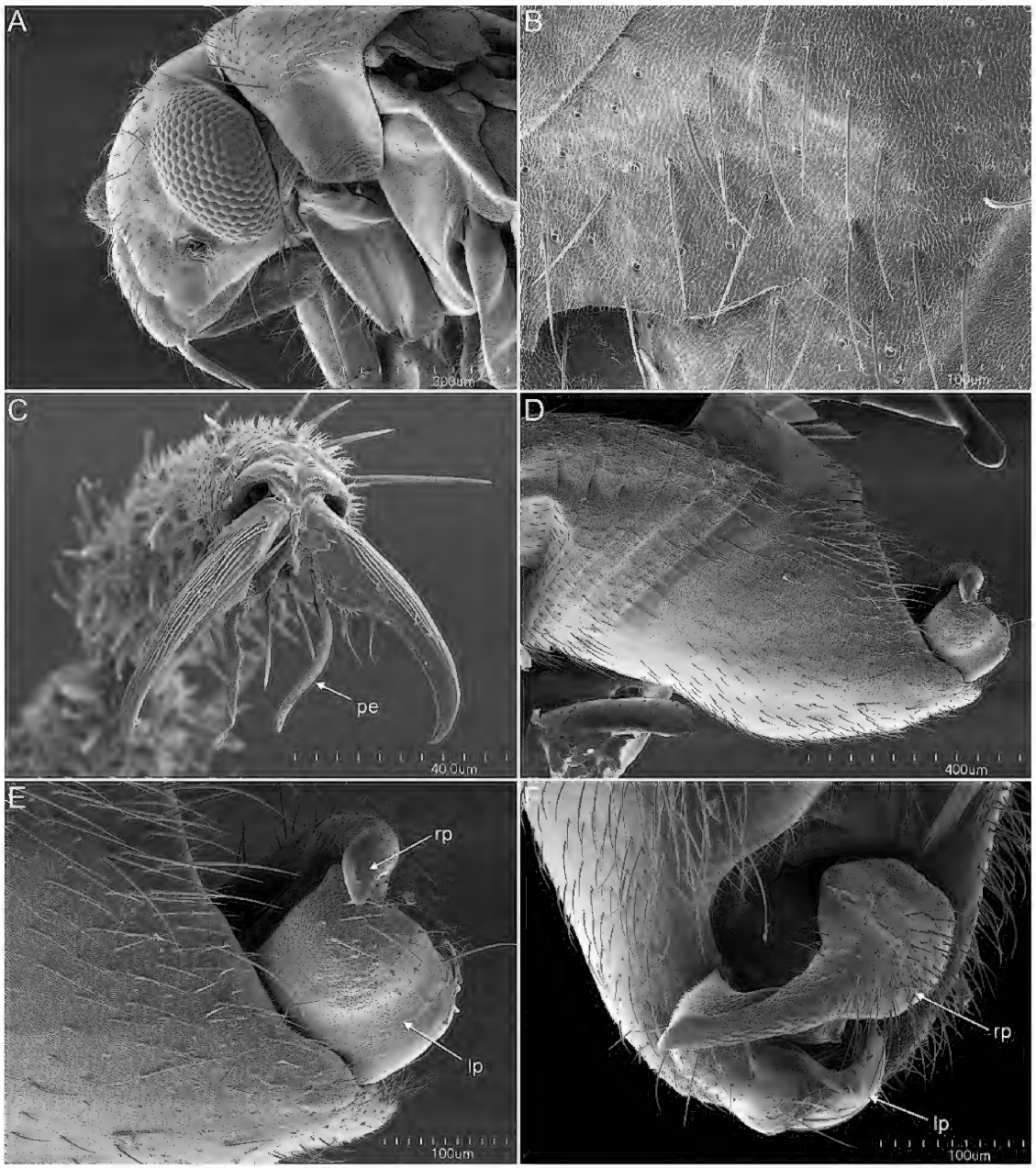


Fig. 5. *Harpagophylus verticordii*, male. Scanning electron micrographs. **A.** Head and prothorax, lateral view. **B.** Setae on hemelytra. **C.** Pretarsus, dorsofrontal view. **D.** Abdomen, lateral view. **E.** Parameres, lateral view. **F.** Parameres, dorsal view. lp = left paramere; pe = parempodium; rp = right paramere (AMNH_PBI 00372775).

pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous pale; scutellum unicolorous with remainder of dorsum; hemelytron unicolorous pale; markings on cuneus absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 5B): Dor-

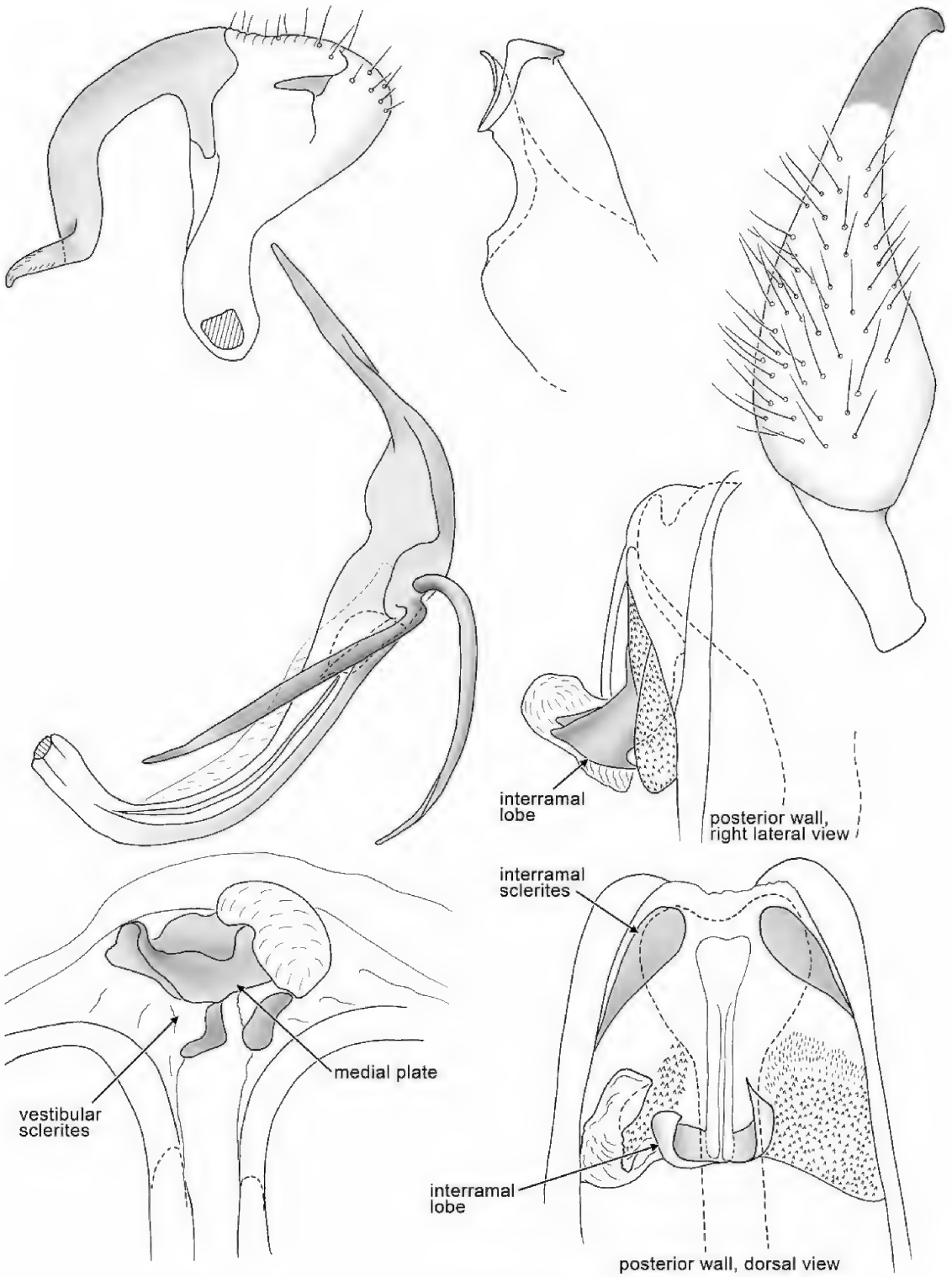


Fig. 6. *Harpagophylus verticordii*, male and female genitalia (AMNH_PBI 00373222, 00373204).

sum with reclining simple setae matching background coloration and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 5A): Somewhat projecting; interocular space relatively large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin 1 diameter above ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. GENITALIA (figs. 5D–F, 6): **Phallotheca**: Nearly erect; dorsal surface without a fingerlike projection, and without a platelike projection; anterior and ventral surfaces without a keel; apex complex.

Female: Slightly more ovoid than male; small, mean total length 2.54, mean width pronotum 0.86. COLORATION (pl. 1): As in male. GENITALIA (fig. 6): As in generic description.

ETYMOLOGY: Named for the host genus, *Verticordia* (Myrtaceae).

HOSTS: *Darwinia diosmoides* (DC.) Benth., *Verticordia forrestii* F. Muell., *Verticordia monadelpha* Turcz (pl. 9A), *V. polytricha* Benth. (pl. 9B) (Myrtaceae).

DISTRIBUTION (map 1): Known from Western Australia, from Kalbarri National Park in the south to the Carnarvon region in the north.

HOLOTYPE: **AUSTRALIA: Western Australia:** Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 1♂ (AMNH_PBI 00370995) (WAMP).

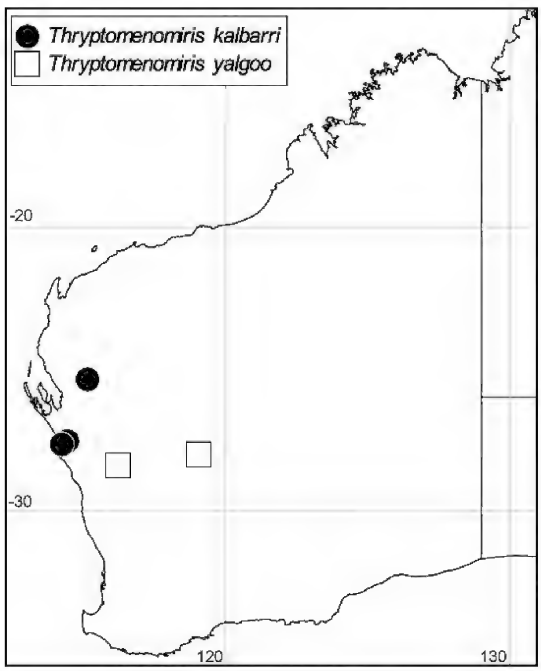
PARATYPES: **AUSTRALIA: Western Australia:** Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Verticordia monadelpha* Turcz. (Myrtaceae), det. PERTH staff, 6♂ (00087221, 00373196–00373200), 5♀ (00373192, 00373205–00373208) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 0512-0594, 9♂ (00373176–00373181, 00373193–00373195), 5♀ (00373187–00373191) (AM), *Verticordia monadelpha* Turcz. (Myrtaceae), det. PERTH staff, 5♂ (00087511, 00087513, 00370998–00370999, 00373186), 5♀ (00371000–00371002, 00373203–00373204) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05-120594, 2♂ (00370996, 00370997) (AMNH), *Verticordia monadelpha* Turcz. (Myrtaceae), det. PERTH staff, 1♂ (00373201) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 1♀ (00373209) (UCR), *Verticordia monadelpha* Turcz. (Myrtaceae), det. PERTH staff, 1♂ (00373202) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 1♀ (00373210) (UNSW), *Verticordia monadelpha* Turcz. (Myrtaceae), det. PERTH staff, 1♂ (00373185) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 3♂ (0037-3182–00373184), 4♀ (00373211–00373214) (WAMP). North West Coast Hiway 72 km NE of jct with Blowholes Rd, 24.18336°S 114.0381°E, 34 m, 28 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Verticordia forrestii* F.Muell. (Myrtaceae), det. Perth-6989004, 1♂ (00373215), 2♀ (00373216, 00373217) (AM), *Verticordia forrestii* F. Muell. (Myrtaceae), det. Perth6989004, 2♀ (00322681, 00322682) (AMNH).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Darwinia diosmoides* (DC.) Benth. (Myrtaceae), det. Perth 05120551, 5♂ (00373218–00373-222), 3♀ (00373223–00373225) (AM).

Thryptomenomiris, new genus
Figures 7–9, 35–37; map 2; plate 1

TYPE SPECIES: *Thryptomenomiris kalbarri*, new species.

DIAGNOSIS: Recognized within the *Melaleucoides* genus group by the small size, the apparent absence of a secondary endosomal strap (fig. 7; 31-3), the unique conformation of the left paramere, with a greatly elongate, medial, apical process (fig. 7; 56-2), and the female vestibulum with large, nearly symmetrical medial plates (fig. 7; 74-1). Also recognized within the *Melaleucoides* genus group by possessing only the ventral endosomal process. Easily confused with *Harpagophylus calytrix*, *Melaleucoides akaina*, and *M. pileanthicola* on the basis of small size and reddish markings on a pale background. Easily distinguished from *Melaleucoides akiana* by the absence of the ventral endosomal process in that species, from *Harpagophylus* spp. by their possession of both ventral and dorsal endosomal processes, and from all of those taxa by the presence of a secondary



Map 2. Localities for species of *Thryptomenomiris*.

endosomal strap and the distinctive structure of the left paramere in *Thryptomenomiris*.

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; small, mean total length 2.44–2.79, mean width pronotum 0.77–0.92. COLORATION (pl. 1): Pale with some brownish or reddish areas. SURFACE AND VESTITURE (fig. 8C): Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 8A): Somewhat projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin 1 diameter above ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (fig. 8D): Parempodia fleshy, recurved, lyriform; pulvilli absent. GENITALIA (figs. 7, 8E, F, 9): **Endosoma**: Base short, curving, C- or J-shaped; body without torsion, primary strap ventral to secondary gonopore, apically greatly elongate, without ornamentation; spinelike, elongate process near gonopore on ventral surface present, recurved toward base of endosoma; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: Smoothly curving or nearly straight on dorsal margin; ventral surface with or without a projecting keel; apex simple. **Left Paramere**: Vertical; shaft at right angles to body; in dorsal perspective (fig. 8F), not exceeding margin of pygophore; in lateral perspective (fig. 8E) covering limited extent of lateral surface of pygophore; body more or less quadrate; apex medially broadly rounded to weakly quadrate; apex posterolaterally with a greatly elongate projection (figs. 7, 8F, 9); anterior process slender and cylindrical in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; small, mean total length 2.52–2.82, mean width pronotum 0.80–0.93. COLORATION (pl. 1): As in male. STRUCTURE: **Head** (fig. 8B). GENITALIA (fig. 7): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; interramal lobes roughly symmetrical, erect, and not ornamented with spicules or with a very few; vestibulum with medial plates sclerotized and readily visible, large, nearly symmetrical, with sclerotized guide structure present as caplike structure with internal differentiation.

ETYMOLOGY: Named for the host genus, *Thryptomene* (Myrtaceae), in combination with *Miris*; gender masculine.

Thryptomenomiris kalbarri, new species
Figure 7, map 2, plate 1

DIAGNOSIS: In addition to the characteristics in the generic diagnosis, recognized by the attenuated apex of the apical spine of the left paramere (fig. 7), in contrast to the blunt spine in *T. yalgoo* (fig. 9).

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; small, mean total length 2.48, mean width pronotum 0.82. COLORATION (pl. 1): **Head**: Uniformly pale; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Tho-**

rax: Pronotum unicolorous pale; scutellum unicolorous with remainder of dorsum; hemelytron pale with endocorium somewhat darker than remainder; markings on cuneus absent, cuneus transparent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head**: Somewhat projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin 1 diameter above ventral margin of eye. *Labium*: Just reaching onto abdomen. GENITALIA (fig. 7): **Phallotheca**: Smoothly curving on dorsal margin; dorsal surface without a fingerlike or platelike projection; anterior surface without a keel; ventral surface with a projecting keel; apex simple.

Female: Slightly more ovoid than male; small, mean total length 2.66, mean width pronotum 0.84. COLORATION (pl. 1): As in male. GENITALIA (fig. 7): See generic description.

ETYMOLOGY: Named for the region of the type locality, Kalbarri, Western Australia; a noun in apposition.

HOSTS: *Thryptomene* sp. (Myrtaceae). The record from *Malleostemon hursthousei* may well represent a genuine host, but would benefit from additional documentation. The record from *Solanum* probably results from specimens being commingled in the field and does not represent a breeding host.

DISTRIBUTION (map 2): Known from Kalbarri National Park and the Gascoyne region in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Thryptomene* sp. (Myrtaceae), det. Perth 05120543, 1♂ (AMNH_PBI 00372768) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Thryptomene* sp. (Myrtaceae), det. Perth 05120543, 5♂ (00373256–00373257, 00373275–00373276, 00373284), 17♀ (00373258–00373265, 00373277–00373283, 00373287, 00373292) (AM), 4♂ (00087217, 00372769–00372770, 00373291), 7♀ (00087218, 00372772–00372774, 00373272–00373274) (AMNH), 1♂ (00373285), 2♀ (00373288, 00373289) (UCR), 2♂ (00373255, 00373290), 1♀ (00373286) (UNSW), 6♀ (00373266–00373271) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 25 km S of Gascoyne Junction, on Towrana Homestead Rd, 25.39014°S 115.1506°E, 232 m, 04 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Solanum* sp. (Solanaceae), det. Field ID, 1♂ (00373293), 1♀ (00373294) (AM). ca. 1 km S of Murchison House HS, Kalbarri National Park, 27.65822°S 114.2394°E, 60 m, 23 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Malleostemon hursthousei* (W.Fitzg.) J.W.-Green (Myrtaceae), det. Perth6988423, 1♂ (00373295) (AM).

Thryptomenomiris yalgoo, new species
Figures 8, 9; map 2; plate 1

DIAGNOSIS: In addition to the characteristics in the generic diagnosis, recognized by the blunt apex of the apical spine of the left paramere (fig. 9), in contrast to the attenuated spine in *T. kalbarri* (fig. 7).

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; small, mean total length 2.65, mean width pronotum 0.88. COLORATION (pl. 1): **Head**: Uniformly pale; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous pale; scutellum entirely red or orange; hemelytron with red or carmine spots, botches, or solid areas; markings on cuneus absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 8C): Dorsum with reclining simple setae matching background coloration and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 8A): Somewhat projecting; interocular space relatively large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base;

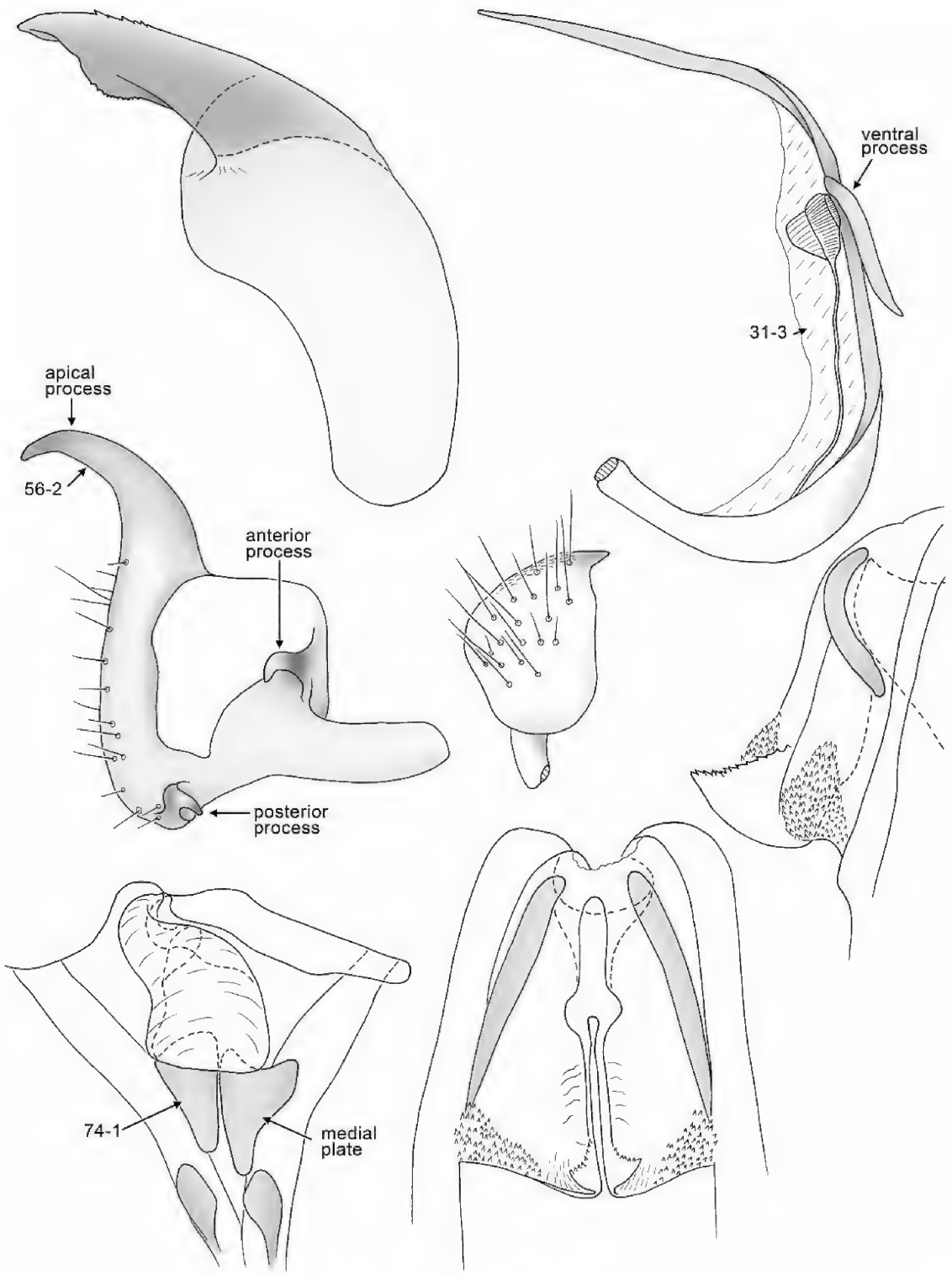


Fig. 7. *Thryptomenomiris kalbarri*, male and female genitalia (AMNH_PBI 00373257, 00373274).

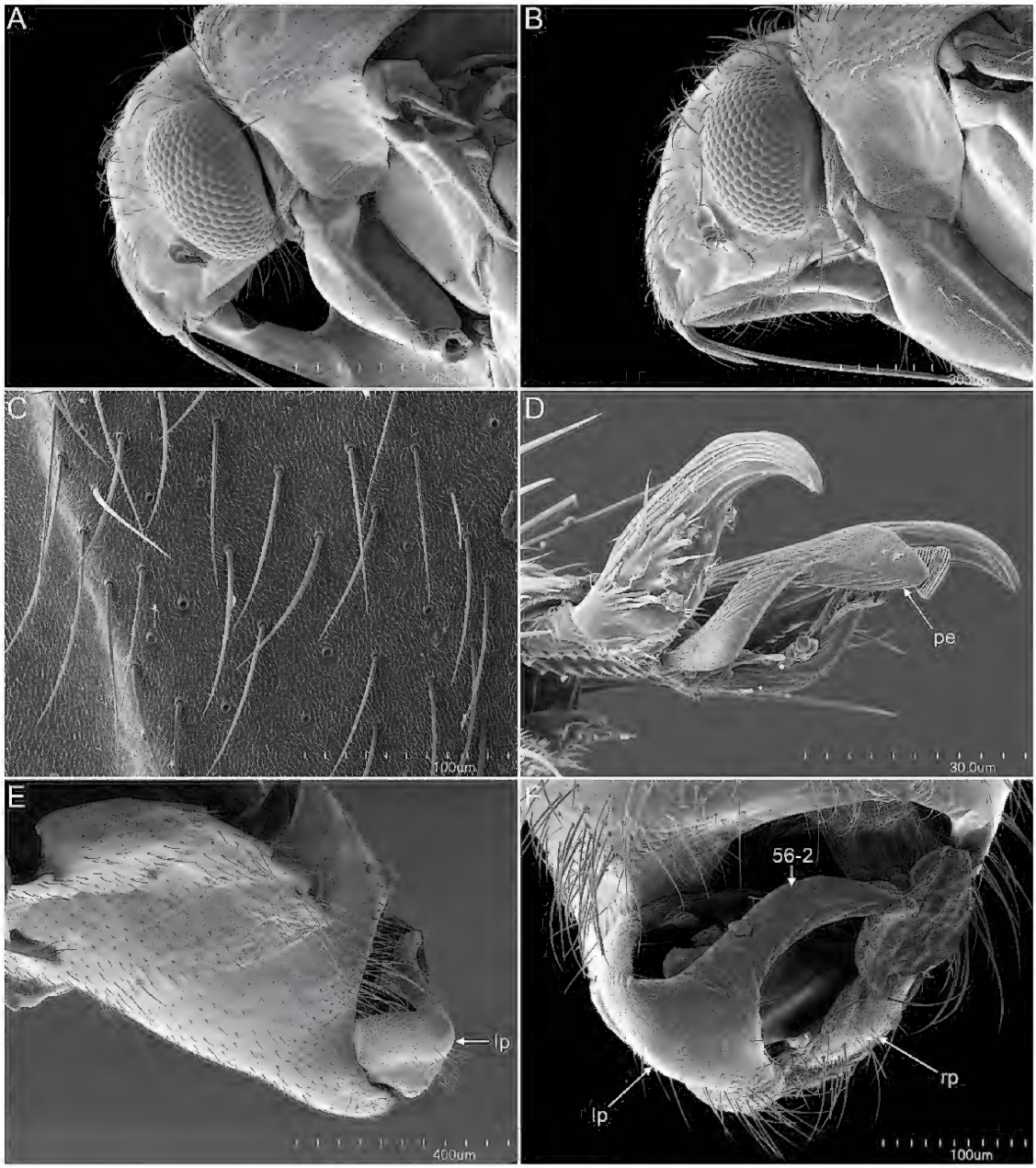


Fig. 8. *Thryptomenomiris yalgoo*. Scanning electron micrographs. **A.** Head and prothorax, lateral view, male. **B.** Head and prothorax, lateral view, female. **C.** Setae on hemelytra. **D.** Pretarsus, laterofrontal view. **E.** Pygophore, lateral view. **F.** Parameres, dorsal view. lp = left paramere; pe = pulvillus; rp = right paramere (AMNH_PBI 00135313).

antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. **Thorax**: *Pretarsus* (fig. 8D): As in generic description. GENITALIA (figs. 8E, F, 9). **Phallotheca**: Smoothly curving on dorsal margin; dorsal surface without a fingerlike or platelike projection; anterior surface with a short to

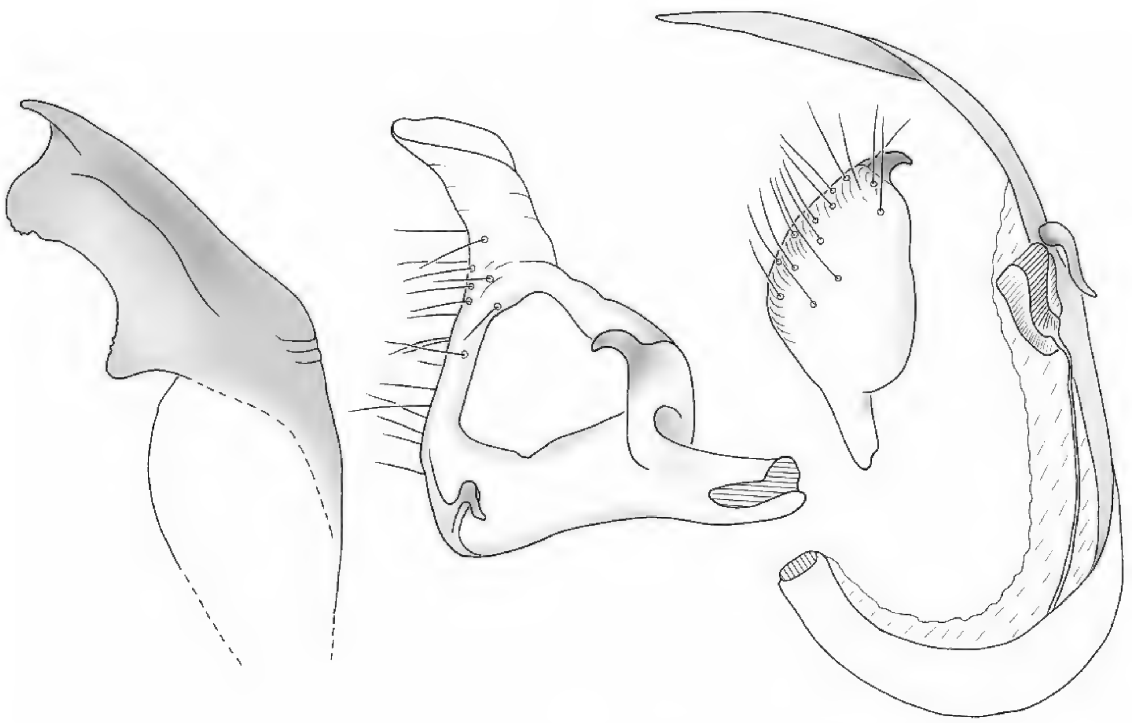


Fig. 9. *Thryptomenomiris yalgoo*, male genitalia (AMNH_PBI 00373296).

elongate keel; ventral surface with a projecting keel; apex simple.

Female: Slightly more ovoid than male; small, mean total length 2.77, mean width pronotum 0.90. COLORATION (pl. 1): As in male. STRUCTURE: **Head** (fig. 8B). GENITALIA: Not examined.

ETYMOLOGY: Named for the small town of Yalgoo in the region of the type locality, Western Australia; a noun in apposition.

HOSTS: *Thryptomene aspera glabra* E. Pritz. (Myrtaceae).

DISTRIBUTION (map 2): Known from Yalgoo and Sandstone (Mid West region) in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 46.5 km W of Yalgoo, 28.41302°S 116.2151°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05120683, 1♂ (AMNH_PBI 00135307) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 24 km W of Sandstone, 28.01426°S 119.0474°E, 650 m, 26 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05095182, 1♂ (00372767), 3♀ (00087220, 00373297–00373298) (AM), 1♂ (00373296) (AMNH). 46.5 km W of Yalgoo, 28.41302°S 116.2151°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05120683, 2♂ (00135304, 00135312), 1♀ (00135317) (AM), 9♂ (00135305–00135306, 00135308–00135311, 00135314–00135316), 10♀ (00135318–00135320, 00135323, 00135325–00135330) (AMNH), 2♀ (00135321, 00135322) (WAMP).

Melaleucoides, new genus

Figures 10–37; maps 3–6; plates 1–4

TYPE SPECIES: *Melaleucoides cassisi*, new species.

DIAGNOSIS: Recognized within the *Melaleucoides* genus group by the unique structure of the left paramere, with its flattened, spoon-shaped form and erect position, covering the dorsal margin of the pygophore in lateral view (fig. 12D; 53-1). Most easily confused with *Harpagophylus* and *Thryptomenomiris* on the basis of unique parempodial structure possessed by all three genera, but easily

separated from both on the structure of the left paramere.

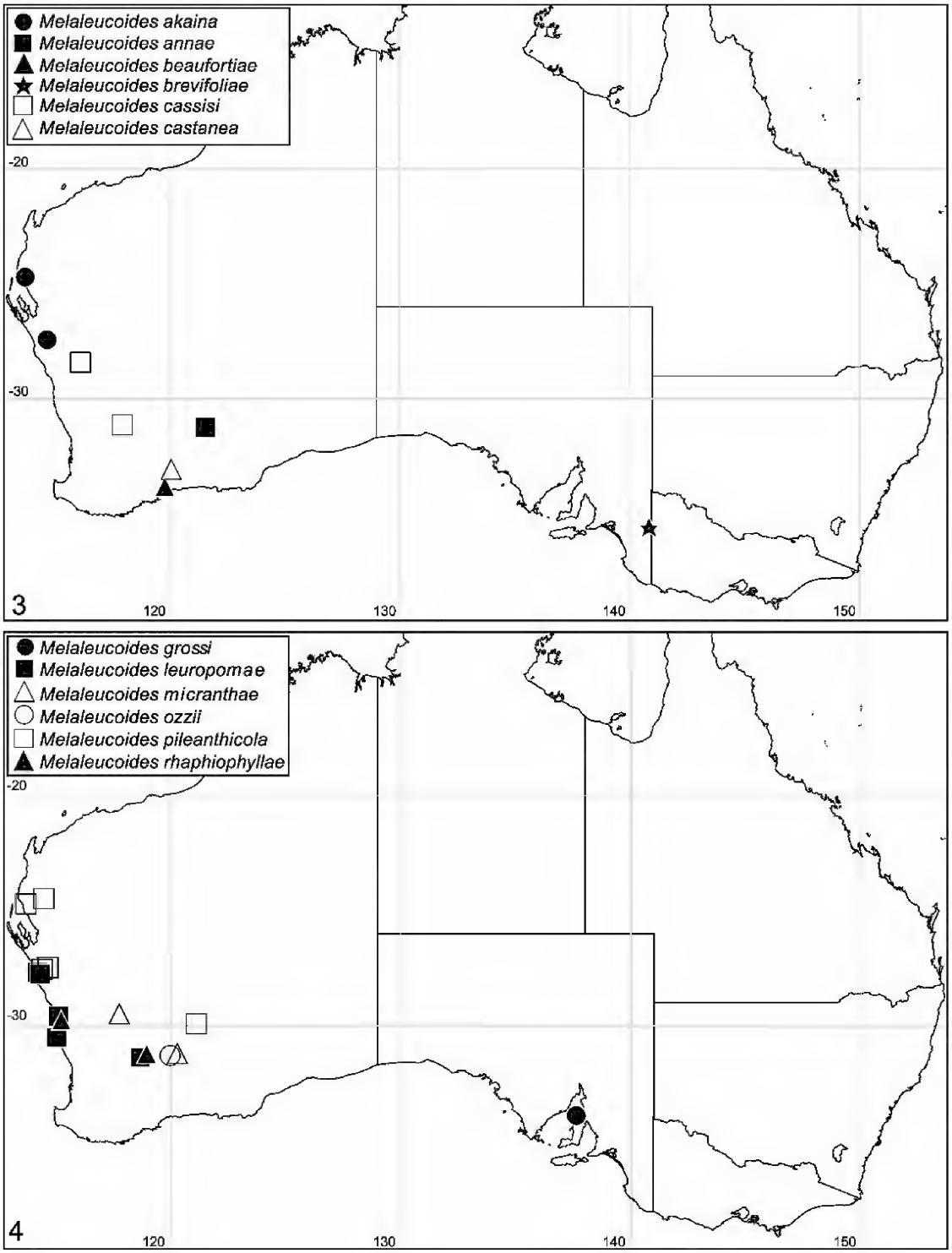
DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 2.33–4.05, mean width pronotum 0.78–1.55. COLORATION (pls. 1–4): Variable, ranging from completely castaneous to almost completely pale, and sometimes with spots. SURFACE AND VESTITURE (figs. 12B, 17B): Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head** (figs. 12A, 14A, 17A, 33A): Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (figs. 12C, 17C, 33D): Parempodia fleshy, recurved, lyriform; pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (e.g., figs. 11, 12E, F, 13, 18, 33F, G, 34): **Endosoma**: Base short; curving, C- or J-shaped; body without torsion; primary strap ventral to secondary gonopore, apically greatly elongate, straight, weakly curving, or angulate relative to body of endosoma, without ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, usually reaching well beyond gonopore, often fused with primary strap, sometimes with denticles or comblike ornamentation; sometimes with elongate spinelike process arising near gonopore on dorsal surface; sometimes with spinelike elongate process near gonopore on ventral surface, ornamented with denticles or not; sometimes with bladderlike process distad of secondary gonopore; secondary gonopore sclerite absent; secondary gonopore usually seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Smoothly curving on dorsal margin, without a fingerlike projection, and with a curving, posteriorly directed, platelike projection; anterior surface without a keel; ventral surface without a projecting keel; posterior surface lacking transparent window; apex simple. **Left Paramere**: Vertical; shaft at right angles to or in same axis as body; in dorsal perspective (fig. 12F) not exceeding margin of pygophore; in lateral perspective (fig. 12E) extending beyond dorsal margin of pygophore; body quadrate or spoon shaped; apex medially broadly rounded to weakly quadrate, sometimes elongated and or recurved; apex posterolaterally simple or in the form of a prolongation; anterior process triangular or elongate and cylindrical in lateral view; posterior process in the form of a short to long, fingerlike projection; base of posterior process with or without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; small, mean total length 2.52–4.26, mean width pronotum 0.82–1.59. COLORATION (pls. 1–4): As in male. GENITALIA (figs. 11, 18, 25, 34): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed; small, nearly symmetrical, triangular; with sclerotized guide structure present as caplike structure with internal differentiation.

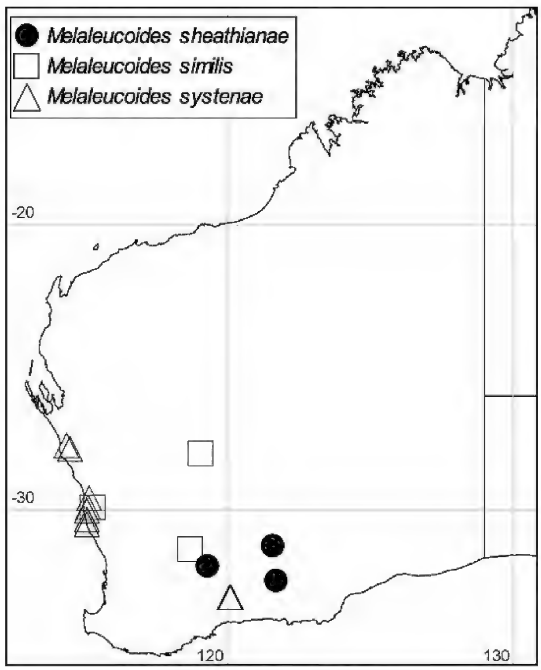
ETYMOLOGY: Named after the host genus, *Melaleuca* (Myrtaceae), in combination with the Latin suffix *-oides*, a diminutive; gender feminine.

KEY TO SPECIES OF *MELALEUCOIDES*

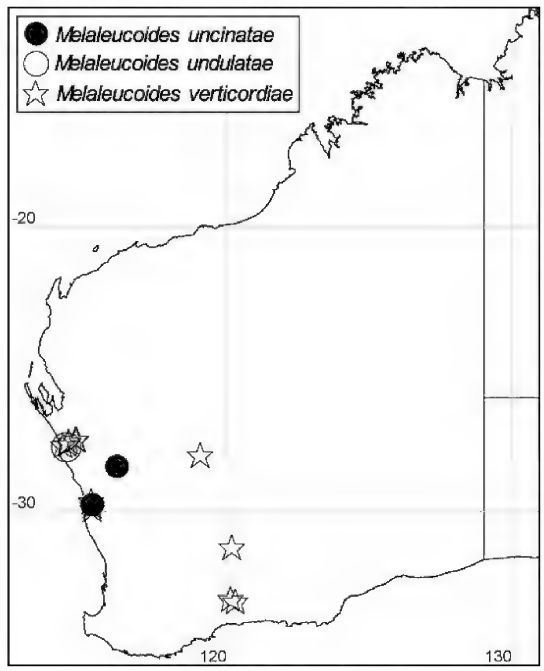
1. Dorsum largely castaneous, including entire clavus (pls. 2–4) 2
– Dorsum not so heavily castaneous, at least clavus and anterior half of endocorium pale, red, or with dark spots on pale background 4
.2. Dorsum uniformly castaneous, including cuneus and apex of scutellum (pl. 2); male genitalia as in figure 19 . . . . . *Melaleucoides castanea*
– At least clavus and apex of scutellum pale . . . 3
3. Male genitalia as in figure 26, phallotheca with a short fingerlike projection on dorsal margin; known from *Melaleuca rhaphiophylla*. . . . . *Melaleucoides rhaphiophyllae*
– Male genitalia as in figure 31, phallotheca with a long fingerlike projection on dorsal margin; known from *Melaleuca uncinata*. . . . . *Melaleucoides uncinatae*



Maps 3 and 4. Localities for species of *Melaleucoides: M. akaina–M. castanea* (top; map 3) and *M. grossi–M. rhapiophyllae* (bottom; map 4).



Map 5. Localities for species of *Melaleucoides: M. sheathianae–M. systenae.*



Map 6. Localities for species of *Melaleucoides: M. uncinatae–M. verticordiae.*

4. Dorsum with conspicuous small dark spots and a pale background 5
– Dorsum without small dark spots on a pale background 8
5. All spots on dorsum small (pl. 2); apex of scutellum dark; male genitalia as in figure 16; known from *Melaleuca brevifolia* . . . . . *Melaleucoides brevifoliae*
– Spots on dorsum larger (pls. 2, 3); apex of scutellum pale as remainder of scutellum. 6
6. Spots round, never coalescent (pls. 2, 3). . . 7
– Many spots of irregular shape, often coalescent, particularly on hemelytron (pl. 2); male genitalia as in figure 15; known from *Beaufortia micrantha* . . . . . *Melaleucoides beaufortiae*
7. Male genitalia as in figure 21; known from *Melaleuca leuropomae* . . . . . *Melaleucoides leuropomae*
– Male genitalia as in figure 22; known from *Melaleuca micrantha* . . . . . *Melaleucoides micranthae*
8. Hemelytron with conspicuous longitudinal red areas 9
– Hemelytron without conspicuous longitudinal red areas. 13
9. Calli castaneous, much darker than surrounding pronotum and strongly contrasting with it 10
– Calli not castaneous, although sometimes weakly red, not strongly contrasting with surrounding pronotum. 11
10. Red markings on hemelytron broad, including most of clavus and endocorium, but not including claval and radiomedial veins (pl. 1); male genitalia as in figure 13, known from *Melaleuca sheathiana* . . . . *Melaleucoides annae*
– Red markings on hemelytron narrow, running along claval and radiomedial veins (pl. 4); male genitalia as in figure 32, known from *Melaleuca undulata* . . . . . *Melaleucoides undulatae*
11. Cuneus almost entirely pale; broad marking on endocorium intensely red (pls. 1, 3) . . 12
– Apical half of cuneus red, in contrast with remainder (pl. 3); male genitalia as in figure 25; known from *Thryptomene kochii* . . . . . *Melaleucoides ozzii*
12. Male genitalia as in figure 25, endosoma with two distinct, elongate, apical spines and a ventral process adjacent to the secondary gonopore; known from *Pileanthus* spp. . . . . *Melaleucoides pileanthicola*
– Male genitalia as in figure 11, endosoma with a single, short, apical spine and no processes associated with the secondary gonopore; known from *Micromyrtus hursthousei* and *Scholtzia leptantha*. . . *Melaleucoides akaina*

13. Coloration of dorsum nearly uniform, either faded green, greenish yellow, or yellow. . . 14
– Coloration of dorsum not uniform, posterior half of endocorium and scutellum dark, in contrast with much of remainder of hemelytron and pronotum (pl. 4); male genitalia as in figure 29; known from *Melaleuca systena* . . . . . *Melaleucoides systenae*
14. Large, robust species, total length at least 3.50, width pronotum at least 1.31; coloration of dorsum faded green or yellow green (pls. 2, 3). 15
– More elongate species, total length no more than 3.76, width pronotum no more than 1.28; coloration of dorsum bright yellow orange (pls. 3, 4). 16
15. Scutellum white or nearly so (pl. 2); male genitalia as in figure 18; known from *Melaleuca uncinata* . . . . . *Melaleucoides cassisi*
– Scutellum orange (pl. 3); male genitalia as in figure 18; known from *Melaleuca sheathiana* . . . . . *Melaleucoides sheathianae*
16. Male genitalia as in figure 28; known from multiple genera of Myrtaceae . . . . . *Melaleucoides similis*
– Male genitalia as in figure 34; known from *Verticordia* spp. and *Pileanthus* spp.,. . . . . *Melaleucoides verticoridiae*

Melaleucoides akaina, new species
Figures 10, 11; map 3; plate 1

DIAGNOSIS: Unequivocally recognized among *Melaleucoides* species by the uniquely short, stout endosoma with a short apical projection, no spinelike processes associated with the region of the secondary gonopore, and a row of denticles on the margin of the secondary gonopore, as well as the long, recurved, tapered, apical spine on the apex of the left paramere. Easily confused with *Harpagophylus calytrix*, *Thryptomenomiris* spp., and *Melaleucoides pileanthicola* on the basis its small size and reddish coloration on a pale background. All of those taxa with ventral/and or dorsal processes on the endosoma and with a long apical endosomal spine.

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; small, mean total length 2.36, mean width pronotum 0.79. COLORATION (pl. 1): **Head**: Uniformly pale; scapus and pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous pale; scutellum unicolorous with remainder of dorsum; hemelytron mostly pale, endocorium somewhat darker than remainder; markings on cuneus absent; membrane, including veins, pale; hind femur unicolorous pale, without black spots; hind tibial spines dark, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 10C): Vestiture of dorsum consisting of simple, recumbent setae with coloration of dorsum. STRUCTURE: **Head**: Somewhat projecting; interocular space relatively large; eyes leaving gena only very slightly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. **Thorax**: *Pretarsus* (fig. 10D): Parempodia fleshy, recurved, lyriform; pulvilli absent. GENITALIA (fig. 11): **Endosoma**: Base short, curving, C- or J-shaped; body with torsion, primary strap dorsal to secondary gonopore, apically short, ratio length apex strap/length secondary gonopore 1.33–1.50, at least weakly arcuate and curving dorsally, no ornamentation; secondary endosomal strap fused with primary strap, reaching just beyond secondary gonopore as fingerlike extension with one tip, and devoid of ornamentation; secondary gonopore seen laterally in lateral view of endosoma, with a denticulate ridge on right side of endosoma. **Phallotheca**: Smoothly curving on dorsal margin; apex simple. **Left Paramere**: Vertical; shaft at right angles to body; in dorsal perspective not exceeding margin of pygophore; in lateral perspective covering limited extent of lateral surface of pygophore; body spoon shaped; apex medially with an elongate, acuminate, recurved, medial spine; anterior process triangular in lateral view; posterior process in the form of a long, straight, slender, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 2.61, mean width pronotum 0.85. COLORATION (pl. 1): Paler than male. STRUCTURE: **Head** (fig. 10A). GENITALIA (fig. 11): Posterior wall laterally with distinct crescent-shaped interramal scler-

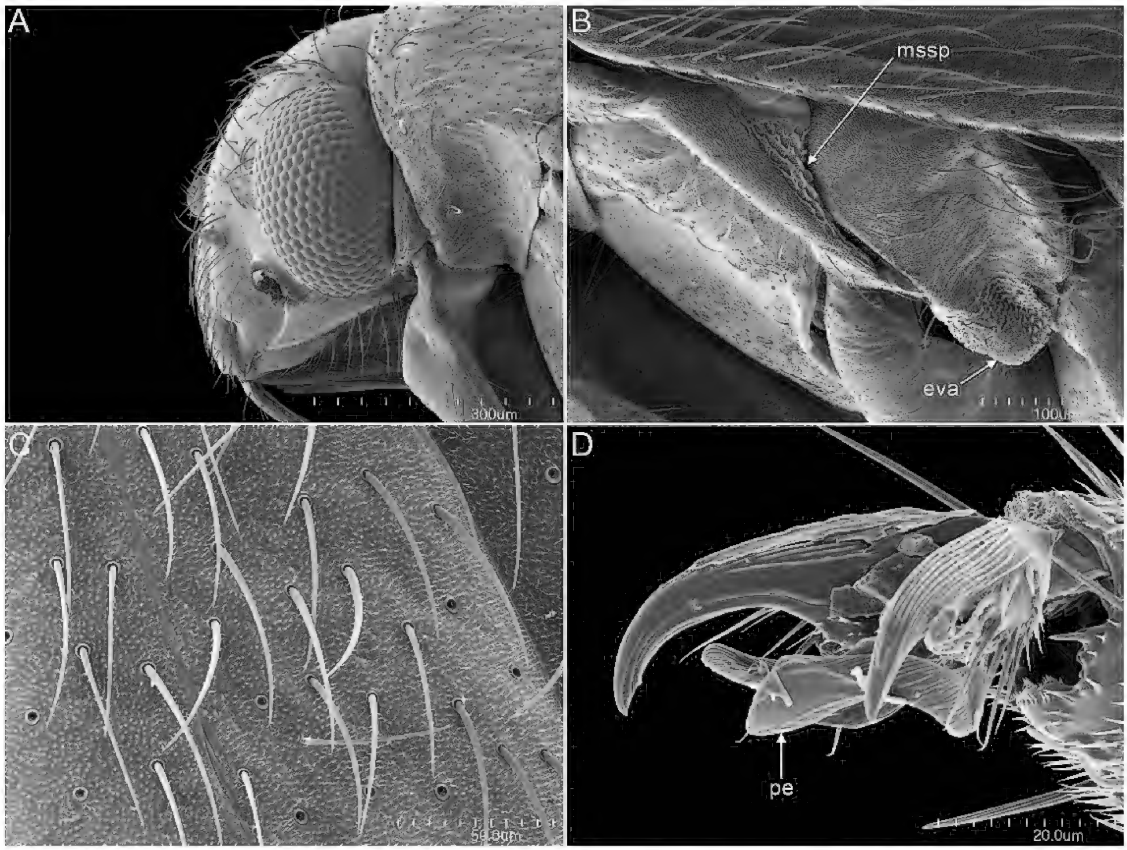


Fig. 10. *Melaleucoides akaina*, female. Scanning electron micrographs. **A.** Head and prothorax, lateral view. **B.** Metathoracic scent-gland evaporatory and mesothoracic spiracle. **C.** Setae on hemelytra. **D.** Pretarsus, dorsofrontal view. eva = evaporatory area; mssp = mesothoracic spiracle; pe = parempodium (AMNH_PBI 00137503).

ites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules, and not reflexed dorsally; interramal lobes roughly symmetrical, erect, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, large, nearly symmetrical, with sclerotized guide structure present as short heavily sclerotized tube on left side.

ETYMOLOGY: Named for the spearlike apex of the left paramere, from the Greek *akaina*, "thorn, spine."

HOSTS: *Micromyrtus hursthousei* W. Fitzg. (pl. 7A) and *Scholtzia leptantha* Benth. (Myrtaceae).

DISTRIBUTION (map 3): Known from two localities north of Kalbarri National Park and the Carnarvon region of Western Australia.

DISCUSSION: *Melaleucoides akaina* is unique among members of the genus in having the endosoma with no processes associated with the region of the secondary gonopore. Nonetheless, other aspects of morphology, especially the novel structure of the parempodia and left paramere agree closely with the remaining species we place in *Melaleucoides*. On the basis of our phylogenetic analyses, we conclude that the relatively simple endosoma in *M. akaina* is the result of reduction.

HOLOTYPE: **AUSTRALIA: Western Australia:** NW Coastal Hiway 58 km N of Kalbarri Road, 27.43701°S 114.6768°E, 500 m, 30 Oct

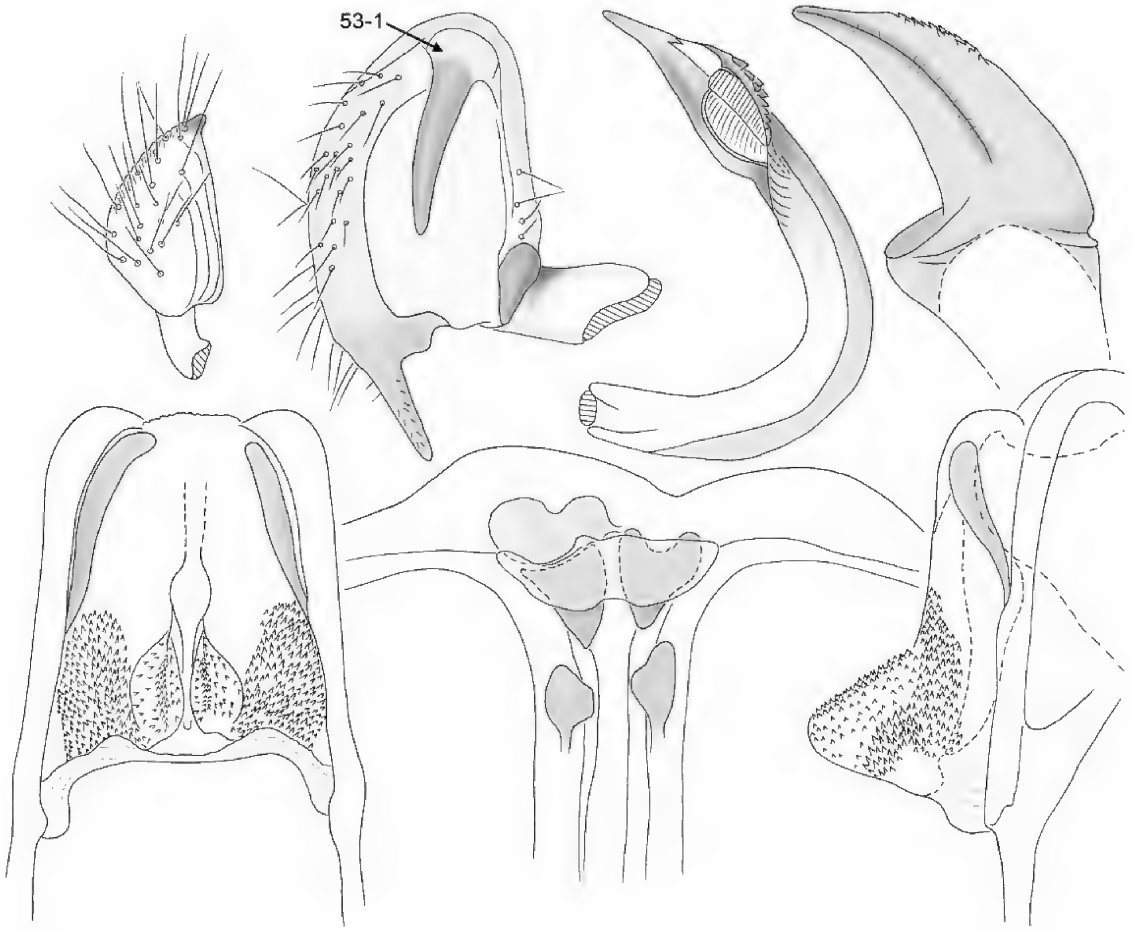


Fig. 11. *Melaleucoides akaina*, male and female genitalia (AMNH_PBI 00087543, 00373174).

1996, Schuh and Cassis, *Micromyrtus hursthousei* W. Fitzgerald (Myrtaceae), det. Perth 05120241, 1♂ (AMNH_PBI 00372340) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** NW Coastal Hiway 58 km N of Kalbarri Road, 27.43701°S 114.6768°E, 500 m, 30 Oct 1996, Schuh and Cassis, *Micromyrtus hursthousei* W. Fitzgerald (Myrtaceae), det. Perth 05120241, 4♂ (00372342, 00372343, 00087543, 00087346), 3♀ (00372345–00087347) (AM), 1♂ (00372344), 1♀ (00372347) (AMNH), 1♂ (00372341), 1♀ (00372348) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Scholtzia leptantha* Benth. (Myrtaceae), det. Perth-6988687, 3♂ (00373164–00373166), 3♀ (00373170–00373172) (AM), 3♂ (00373167–00373169), 2♀ (00373173, 00373174) (AMNH).

Melaleucoides annae, new species
Figures 12, 13; map 3; plate 1

DIAGNOSIS: Recognized by the castaneous calli, the elongate red markings on the hemelytron (pl. 1), and the endosoma with denticles on the secondary strap distad of the secondary gonopore and a recurved ventral process associated with the secondary gonopore (fig. 13). Most easily confused with *M.*

undulatae on the basis of coloration, but the red markings on the hemelytron more strongly linear in that species (pl. 4) and the lack of denticles distad of the secondary gonopore, a dorsal rather than a ventral process, and a bladderlike process just distad of the gonopore (fig. 32).

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 3.46, mean width pronotum 0.1.29. COLORATION (pl. 1): **Head**: Uniformly pale; scapus yellow to dirty yellow; pedicellus dirty yellow proximally, weakly to heavily infuscate distally; labium generally infuscate, heavily so apically. **Thorax**: Pronotum pale with castaneous calli and sometimes humeri; scutellum white; hemelytron with red or carmine areas along mesial margin of clavus and on endocorium; markings on cuneus present as a contrasting white basal fascia, remainder red; membrane weakly fumose, veins pale; hind femur with a few brown or black spots; hind tibial spines black with very small dark bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 12B): Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 12A): Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (fig. 12C): Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (figs. 12E, F, 13): **Endosoma**: Primary strap apically greatly elongate, angled dorsally relative to body of endosoma, no ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, fused with primary strap, ornamented with some short denticles; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, strongly recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface with a curving, posteriorly directed, platelike projection; anterior surface with a short to elongate keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly rounded; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.51, mean width pronotum 0.1.36. COLORATION (pl. 1): As in male. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular; with sclerotized guide present as caplike structure with internal differentiation.

ETYMOLOGY: Named for Anna Massie, with thanks for her encouragement and interest in our work on the Australian Miridae fauna.

HOSTS: *Melaleuca sheathiana* W. Fitz. (Myrtaceae) (pl. 6A–C).

DISTRIBUTION (map 3): Known from one locality in the Goldfields region of Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W. Fitzg. (Myrtaceae), det. Perth 05671396, 1♂ (AMNH_PBI 00129550) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W. Fitzg. (Myrtaceae), det. Perth 05671396, 23♂ (00371206, 00371250–00371261, 00371265, 00371288–00371296), 35♀ (00371266–00371270, 00371272–00371277, 00371280–

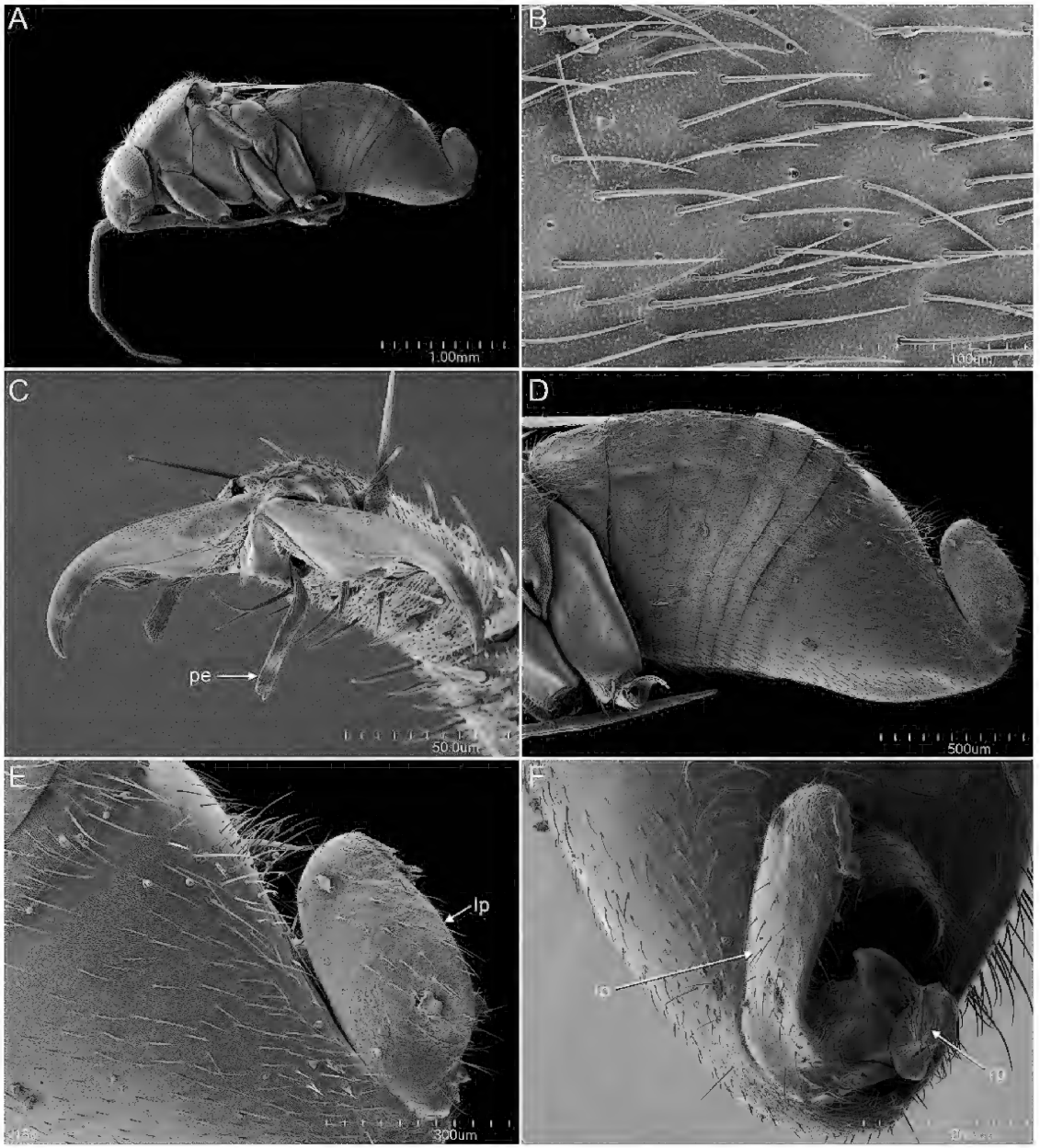


Fig. 12. *Melaleucoides annae*, male. Scanning electron micrographs. **A.** Lateral view. **B.** Setae on hemelytra. **C.** Pretarsus, frontal view. **D.** Abdomen, lateral view. **E.** Pygophore and left paramere, lateral view. **F.** Pygophore and parameres, dorsal view. lp = left paramere; pe = parempodium; rp = right paramere (AMNH_PBI 00129566).

00371285, 00371287, 00371297–00371312, 00372109), 1 nymph (00371313) (AM), 31♂ (00087299, 00087498, 00129544–00129547, 00129551–00129569, 00129595–00129600), 17♀ (00087300, 00129548, 00129572–00129579, 00129582–00129583, 00129601–00129604, 00-371278) (AMNH), 3♂ (00372092–00372094), 2♀ (00372113, 00372114) (ANIC), 1♂ (0037-1264), 1♀ (00371286) (CNC), 2♂ (00129570, 00129571), 2♀ (00129580, 00129581) (UCR),

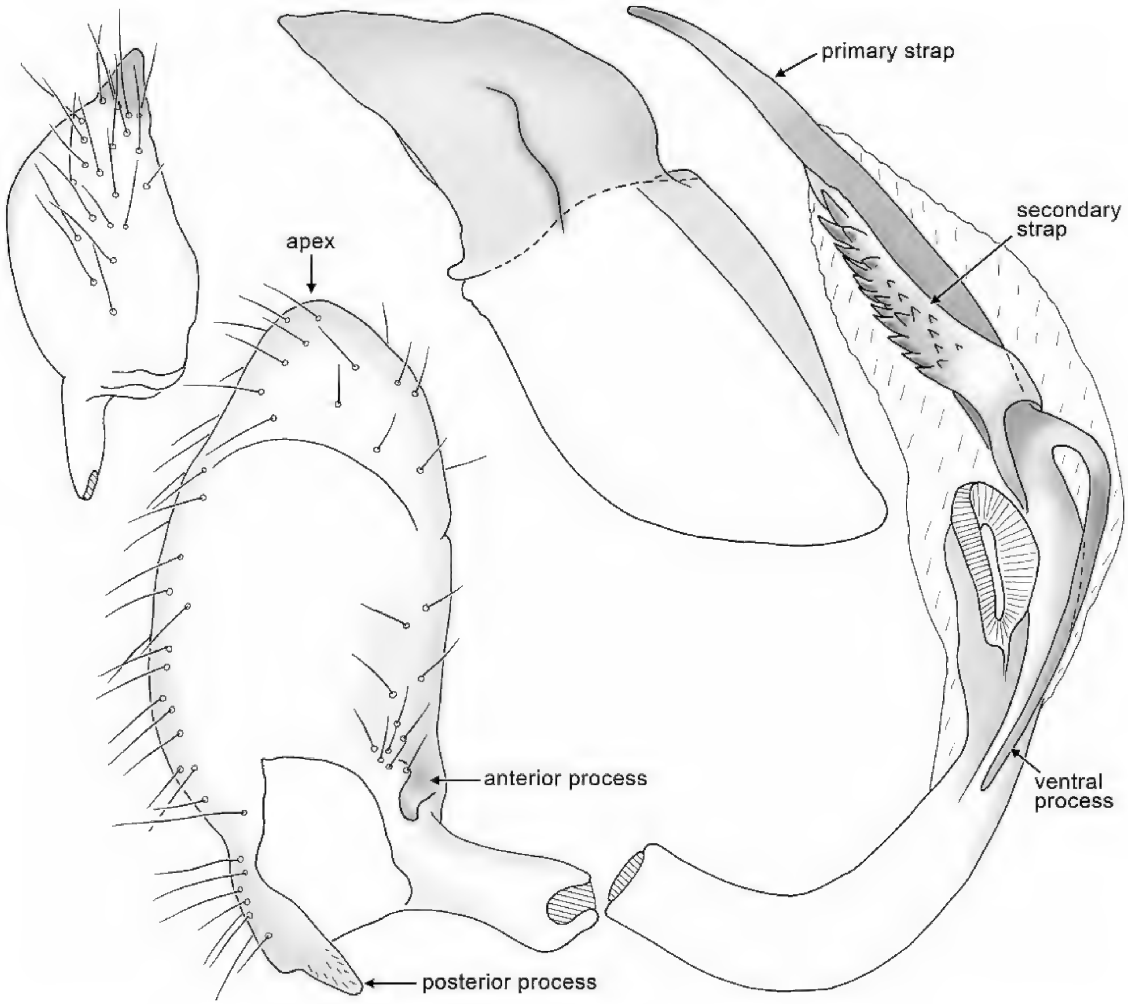


Fig. 13. *Melaleucoides annae*, male genitalia (AMNH_PBI 00129556).

10♂ (00372082–00372091), 4♀ (00372095, 00372110–00372112) (UNSW), 1♂ (00371262), 1♀ (00371271) (USNM), 9♂ (00129531–00129533, 00371207–00371212), 16♀ (00129534–00129543, 00371223–00371228) (WAMP), 1♂ (00371263), 1♀ (00371279) (ZISP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W.Fitzg. (Myrtaceae), det. Perth 05671396, 14♂ (00371192–00371205), 10♀ (00371213–00371222) (AM).

Melaleucoides beaufortiae, new species
Figures 14, 15; map 3; plate 2

DIAGNOSIS: Unique among *Melaleucoides* spp. for the coalescent small dark spots on the dorsum (pl. 2), the compact body form, and the structure of the male genitalia, the left paramere with a moderately elongate, blunt, fingerlike, recurved, medial apical process, and the endosoma with some denticles on the postgonoporal region of the secondary strap but lacking both the dorsal and ventral processes frequently seen in the genus (fig. 15). Most easily confused with *M.*

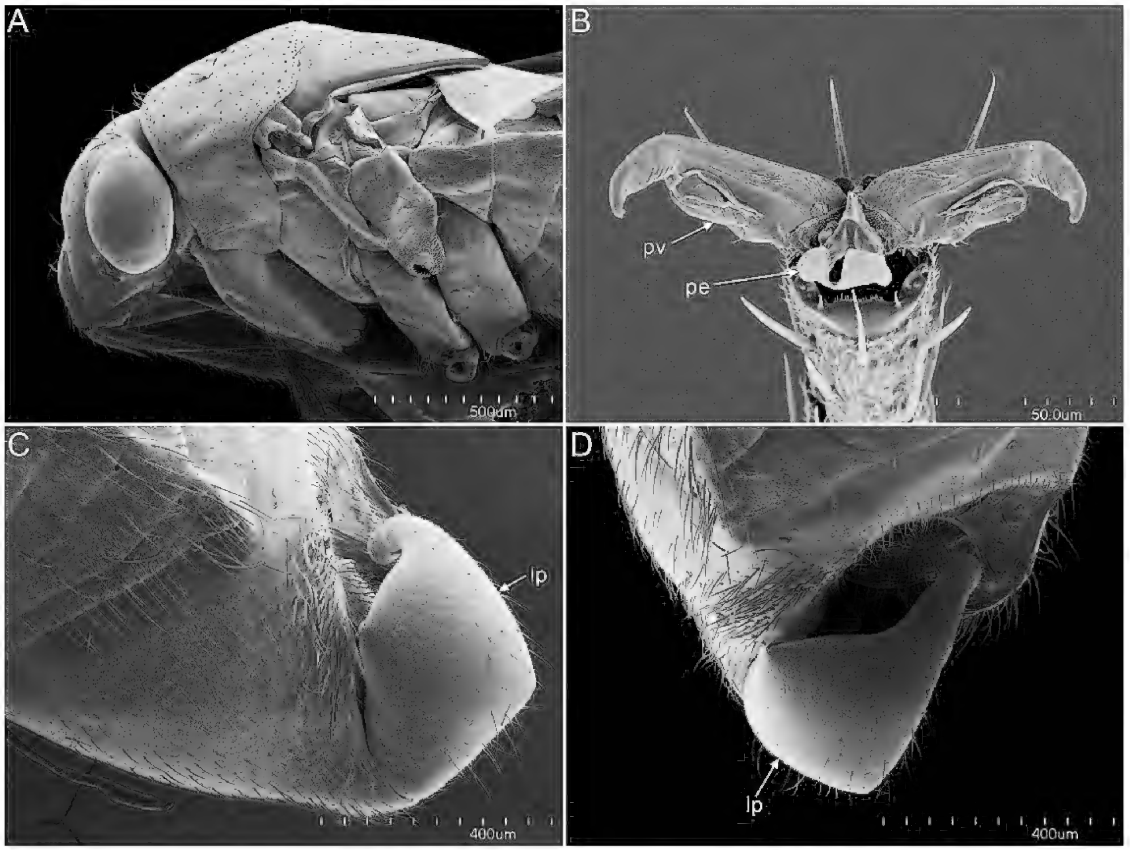


Fig. 14. *Melaleucoides beaufortiae*, male. Scanning electron micrographs. **A.** Head and thorax, lateral view. **B.** Pretarsus, frontal view. **C.** Pygophore, lateral view. **D.** Pygophore, dorsal view. lp = left paramere; pe = parempodium; pv = pulvillus (AMNH_PBI 00371072).

brevifoliae, *M. leuropomae*, and *M. micranthae*, but the spots never coalescent in those species and the apical medial process of the left paramere much less elongate and not recurved (figs. 16, 21, 22, respectively).

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 2.98, mean width pronotum 1.10. COLORATION (pl. 2): **Head**: Pale, clypeus dark and large, dark, linear, bilateral markings on frons; scapus pale with a dark base; pedicellus dirty yellow proximally, weakly to heavily infuscate distally; labium generally infuscate, heavily so apically. **Thorax**: Pronotum pale with brown spots of varying size; scutellum pale with brown spots; hemelytron unicolorous pale with brown spots of varying size, some coalescent; markings on cuneus present as a red to castaneous apex; membrane weakly fumose, veins pale; hind femur with many brown or black spots; hind tibial spines dark with conspicuous dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head** (fig. 14A): Somewhat projecting; interocular space moderate; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with dorsal margin somewhat below ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. **Thorax**: *Pretarsus* (fig. 14B): Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 14C, D, 15): **Endosoma**: Primary strap apically greatly elongate, curving dorsally near apex, without ornamentation; secondary endosomal strap fused with primary strap

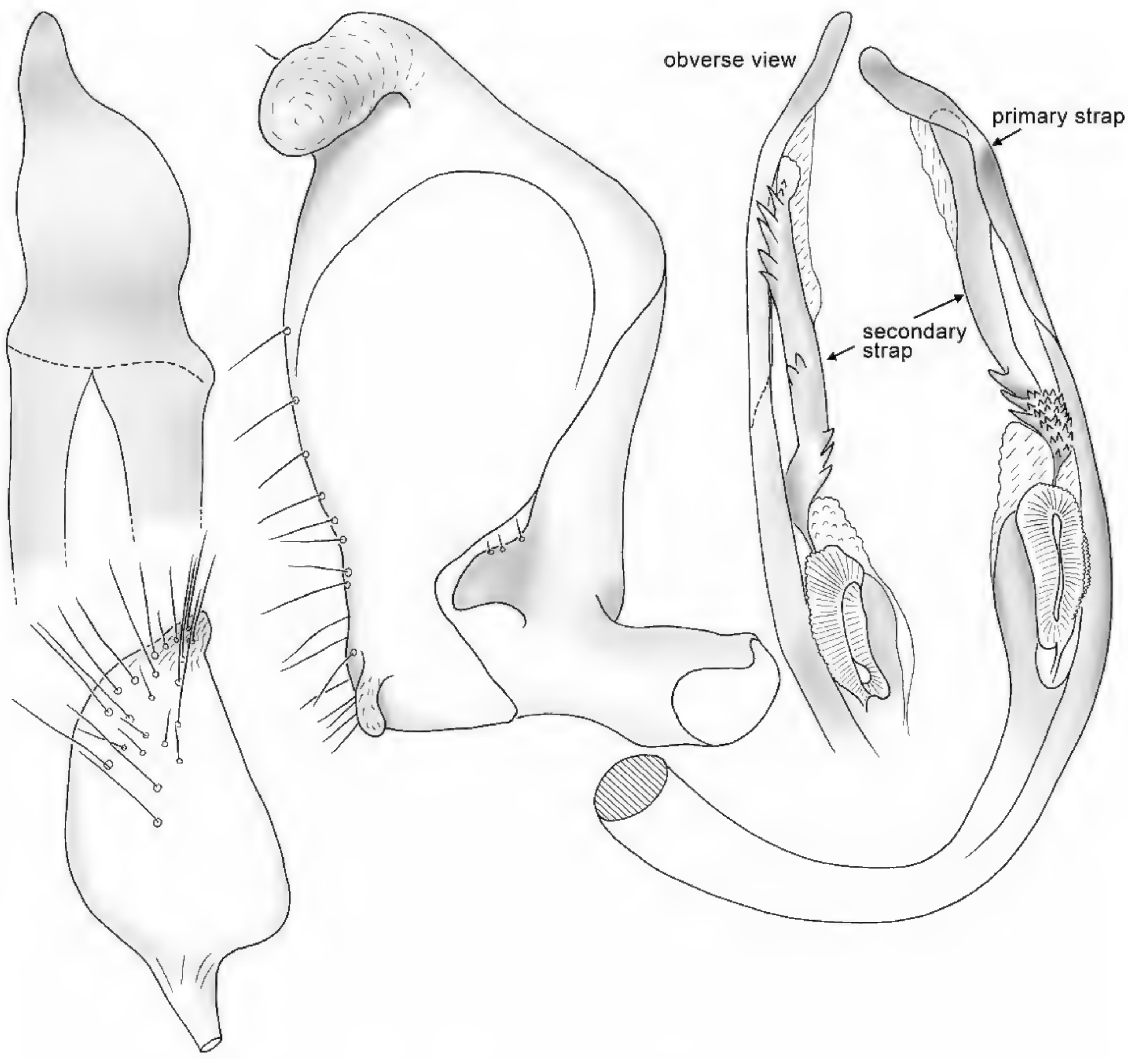


Fig. 15. *Melaleucoides beaufortiae*, male genitalia (AMNH_PBI 00371078).

proximal to secondary gonopore, reaching well beyond gonopore, ornamented with short denticles just distad of gonopore; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface absent; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially drawn into a blunt, recurved, fingerlike process; anterior process triangular in lateral view; posterior process in the form of a short curved fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.06, mean width pronotum 1.13. COLORATION (pl. 2): As in male. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of

posterior wall without spicules, and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular; with sclerotized guide present as short heavily sclerotized tube on left side.

ETYMOLOGY: Named for the host genus, *Beaufortia* R. Br. (Myrtaceae).

HOSTS: *Beaufortia micrantha* Schauer (Myrtaceae).

DISTRIBUTION (map 3): Known from one locality in Fitzgerald River National Park in Southwestern Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Fitzgerald River National Park, Hammersley Road, 33.81038°S 119.787°E, 215 m, 06 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Beaufortia micrantha* Schauer (Myrtaceae), det. Perth 05055482, 1♂ (AMNH_PBI 00371069) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** Fitzgerald River National Park, Hammersley Road, 33.81038°S 119.787°E, 215 m, 06 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Beaufortia micrantha* Schauer (Myrtaceae), det. Perth 05055482, 10♂ (00371063, 00371065–00371068, 00371072–00371075, 00371077), 5♀ (00371082, 00371084–00371085, 00371087, 00371095) (AM), 7♂ (00087473, 00371064, 00371070–00371071, 00371076, 00371078–00371079), 6♀ (00371083, 00371086, 00371088–00371089, 00371094, 00371097) (AMNH), 1♂ (00371080), 1♀ (00371098) (UNSW), 3♂ (00087247–00087248, 00371081), 4♀ (00371090, 00371092–00371093, 00371096) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** Fitzgerald River National Park, Hammersley Road, 33.81038°S 119.787°E, 215 m, 06 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Beaufortia micrantha* Schauer (Myrtaceae), det. Perth 05055482, 1 nymph (00371091) (AM).

Melaleucoides brevifoliae, new species
Figure 16, map 3, plate 2

DIAGNOSIS: Recognized by the presence of numerous tiny dark spots on the weakly greenish dorsum (pl. 2), and the structure of the male genitalia, the left paramere with a somewhat elongate apex positioned asymmetrically on the anterior side of the structure; endosoma unknown. Most easily confused with *M. beaufortiae*, *M. leuropomae*, and *M. micranthae*, but the spots in those species always larger and the apical medial process much longer in *M. beaufortiae* and placed medially in all three species (figs. 15, 21, 22, respectively).

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; mean total length 3.41, mean width pronotum 1.10. COLORATION (pl. 2): **Head**: Pale or pale with some small dark dots; scapus and pedicellus unicolorous pale; labium generally infuscate, heavily so apically. **Thorax**: Pronotum pale with tiny brown spots; scutellum pale with brown spots, apex dark; hemelytron unicolorous pale with small brown spots; markings on cuneus present as small dark dots; membrane veins white or pale; hind femur with many brown or black spots; hind tibial spines black with conspicuous dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head**: Somewhat projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 16): **Endosoma**: All available specimens teneral and therefore not observed. **Phallotheca**: Nearly erect; dorsal surface with a curving, posteriorly directed, platelike projection; apex simple. **Left Paramere**: Shaft at right angles to body; body broad basally, apex medially drawn into a blunt fingerlike process; anterior process triangular in lateral view; posterior process in the form of a long, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.70, mean width prono-

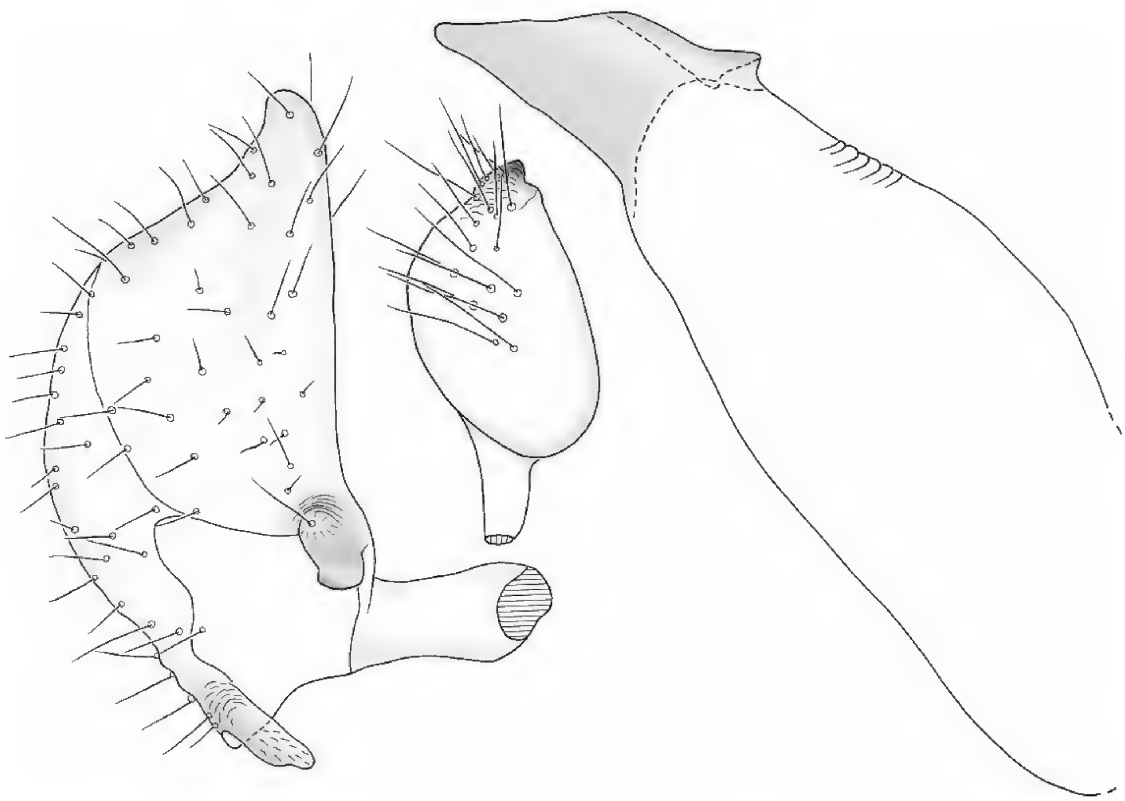


Fig. 16. *Melaleucoides brevifoliae*, male genitalia (AMNH_PBI 00130428).

tum 1.36. COLORATION (pl. 2): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host species, *Melaleuca brevifolia* (Myrtaceae).

HOSTS: *Melaleuca brevifolia* Turcz. (Myrtaceae).

DISTRIBUTION (map 3): Recorded from one locality on the eastern border of southern South Australia. *Melaleucoides brevifoliae* is one of only two species in the *Melaleucoides* genus group that is known to occur outside Western Australia.

DISCUSSION: All available male specimens for this species were apparently partially teneral, because after several dissections we were unable to find a specimen in which the endosoma was suitably sclerotized for observation and illustration.

HOLOTYPE: **AUSTRALIA: South Australia:** Scorpion Springs Cons. Park, 35.60421°S 140.8646°E, 125 m, 10 Nov 1998, Schuh, Cassis, Silveira, *Melaleuca brevifolia* Turcz. (Myrtaceae), det. Det: Royal Bot. Gard. NSW NSW427362, 1♂ (00130421) (SAMA).

PARATYPES: **AUSTRALIA: South Australia:** Scorpion Springs Cons. Park, 35.60421°S 140.8646°E, 125 m, 10 Nov 1998, Schuh, Cassis, Silveira, *Melaleuca brevifolia* Turcz. (Myrtaceae), det. Det: Royal Bot. Gard. NSW NSW427362, 9♂ (00087236, 00371099–00371102, 00371121–00371124), 6♀ (00371118–00371120, 00371130–00371132) (AM), 12♂ (00087506, 00130422–00130432), 9♀ (00087237, 00130433–00130440) (AMNH), 1♂ (00371103), 1♀ (00371117) (SAMA).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: South Australia:** Scorpion Springs Cons. Park, 35.60421°S 140.8646°E, 125 m, 10 Nov 1998, Schuh, Cassis, Silveira, *Melaleuca brevifolia* Turcz. (Myrtaceae), det. Det: Royal Bot. Gard. NSW NSW427362, 18 nymphs (00371104–00371116, 00371125–00371129) (AM).

Melaleucoides cassisi, new species
Figures 17, 18; map 3; plate 2

DIAGNOSIS: Recognized among *Melaleucoides* spp. by the relatively large size (mean total length 3.95), the monotonous pale coloration of the dorsum, and the structure of the male genitalia, notably the clublike aggregation of denticles distad of the secondary gonopore and their position ventral to the primary endosomal strap. Most similar in size and coloration to *M. grossi* and *M. sheathiana*. Distinguished from the former by the arrangement of the endosomal denticles on an elongate, conical, free spine ventral to the primary endosomal spine, and from the latter by the strongly orange scutellum and the dorsal position of the endosomal spicules and the fusion of the primary and secondary endosomal straps distad of the secondary gonopore in that species.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 3.95, mean width pronotum 1.38. COLORATION (pl. 2): **Head**: Uniformly pale, faded yellow; scapus and pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous, faded yellow; scutellum white; hemelytron unicolorous, faded yellow; cuneus mostly white, markings absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 17B): Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 17A): Barely projecting; interocular space relatively large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (fig. 17C, D): Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (figs. 17E, F, 18): **Endosoma**: Primary strap apically greatly elongate, weakly arcuate and curving ventrally, without ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, fused with primary strap distal to gonopore ornamented with denticles at about midpoint of apical region of primary strap; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, strongly recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: More or less right angulate; dorsal surface with a curving, posteriorly directed, platelike projection; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially drawn into a blunt, recurved, fingerlike process; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Distinctly more ovoid than male; mean total length 4.12, mean width pronotum 1.53. COLORATION (pl. 2): As in male. GENITALIA (fig. 18): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular; with sclerotized guide present as short, heavily sclerotized tube on left side.

ETYMOLOGY: Named for Gerasimos Cassis, who collected most of the known specimens, in recognition of his groundbreaking efforts in field documentation and study of Australian Heteroptera.

HOSTS: *Melaleuca uncinata* R. Br. (Myrtaceae).

DISTRIBUTION (map 3): Known from two localities west and north of Yalgoo and in the northeastern Wheatbelt region of Western Australia.

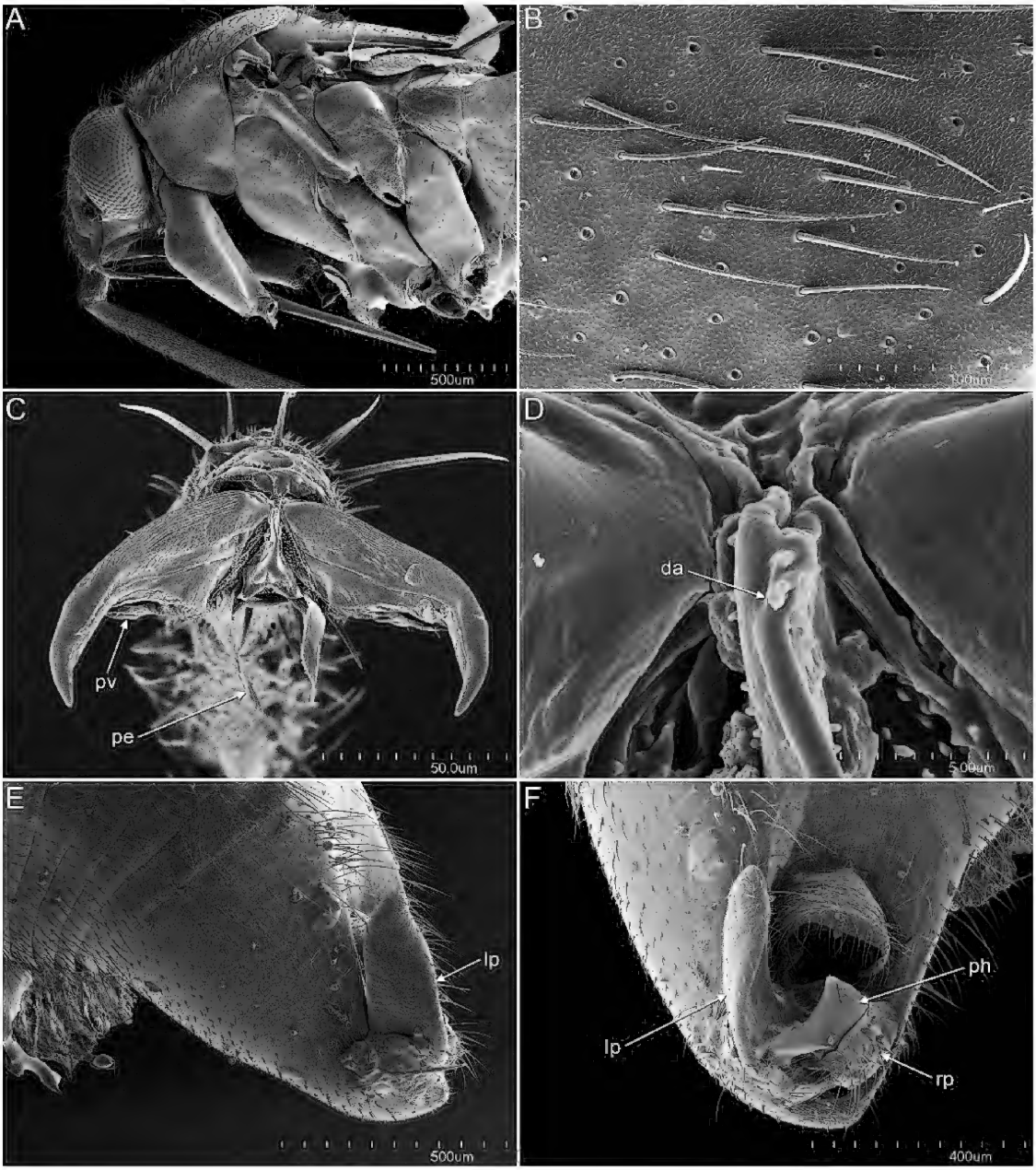


Fig. 17. *Melaleucoides cassisi*, male. Scanning electron micrographs. **A.** Head and thorax, lateral view. **B.** Setae on hemelytra. **C.** Pretarsus, frontal view. **D.** Pretarsus, frontal view, detail of rudimentary dorsal arolium. **E.** Pygophore, lateral view. **F.** Pygophore, dorsal view. da = dorsal arolium; lp = left paramere; pe = parempodium; ph = phallotheca; pv = pulvillus; rp = right paramere (AMNH_PBI 00371141).

HOLOTYPE: **AUSTRALIA: Western Australia:** 56.6 km W of Yalgoo, 28.42397°S 116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R. Br. (Myrtaceae), det. Perth 05120640, 1♂ (AMNH_PBI 00371607) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 56.6 km W of Yalgoo, 28.42397°S

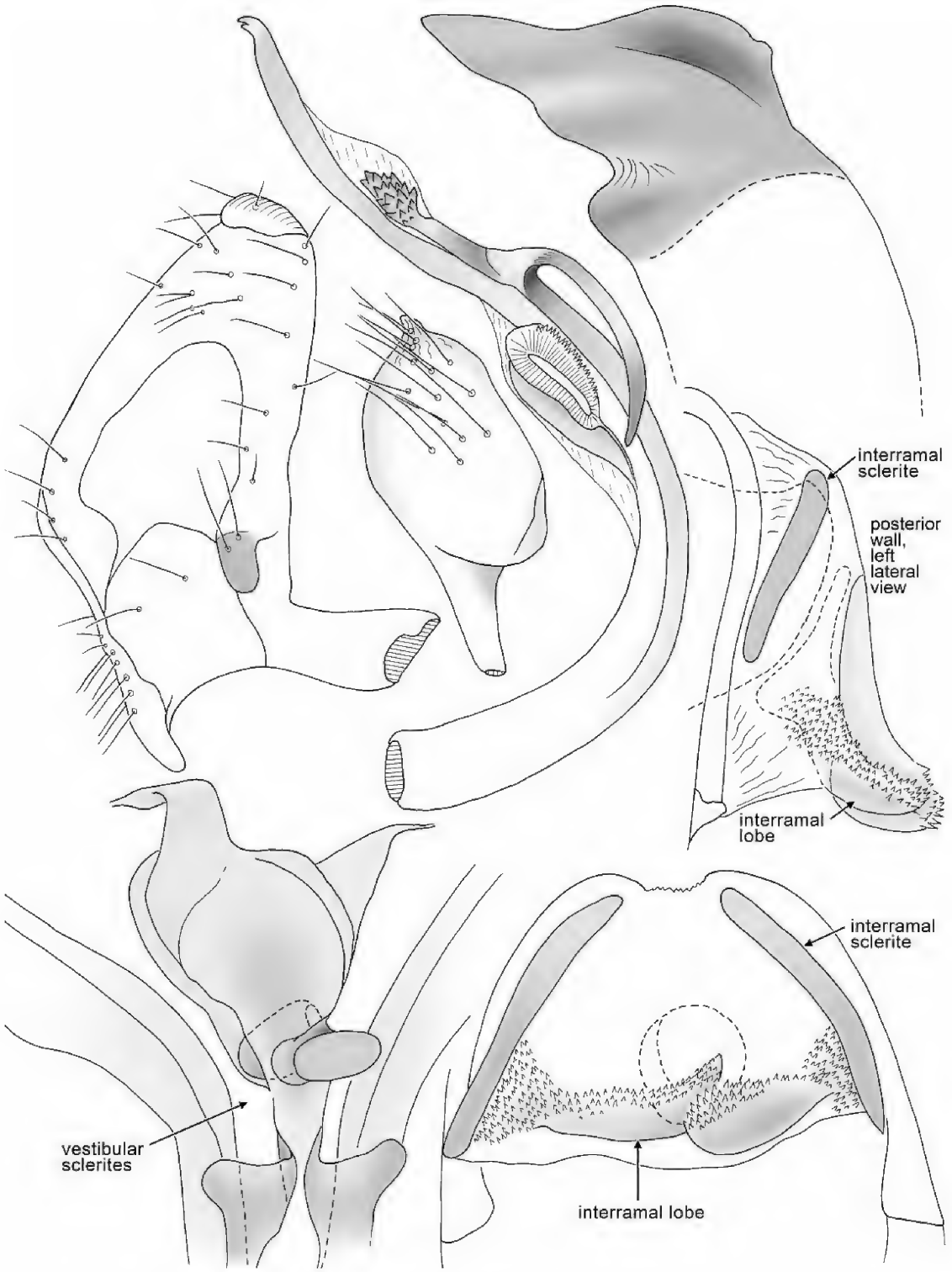


Fig. 18. *Melaleucoides cassisi*, male and female genitalia (AMNH_PBI 00371147, 00371699).

116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R. Br. (Myrtaceae), det. Perth 05120640, 10♂ (00087172, 00371142–00371150), 33♀ (00087173, 00371151–00371182) (AM), 24♂ (00087452, 00371608–00371610, 00371612–00371630, 00371639), 31♀ (00371565–00371593, 00371611, 00371699) (AMNH), 1♂ (00371631) (UCR), 1♂ (00371056), 6♀ (00371057–00371062) (UNSW), 6♂ (00371633–00371638), 21♀ (00371183–00371191, 00371594–00371605) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 13.5 km W of Nungarin on Rt 50, 31.11547°S 117.945°E, 300 m, 16 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, 1♂ (00129374) (UNSW). 56.6 km W of Yalgoo, 28.42397°S 116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R. Br. (Myrtaceae), det. Perth 05120640, 9♂ (00371133–00371141) (AM), 41♀ (00371641–00371661, 00371663–00371682), 1 nymph (00371662) (AMNH), 1♂ (00371632), 4♀ (00371687–00371690) (CNC), 4♀ (00371683–00371686) (UCR), 1♂ (00371640), 4♀ (00371695–00371698) (USNM), 1♂ (00371606), 4♀ (00371691–00371694) (ZISP).

Melaleucoides castanea, new species
Figure 19, map 3, plate 2

DIAGNOSIS: Recognized uniquely among *Melaleucoides* spp. by the entirely castaneous coloration, the large, broad body (pl. 2), and the structure of the male genitalia, with the left paramere elongate but broad apically, and the endosoma with a long, apically oriented, ventral process associated with the secondary gonopore. Coloration most similar to *M. rhaphiophyllae* and *M. uncinatae*, but both of those species with the apex of the scutellum and the base of the cuneus pale.

DESCRIPTION: *Male*: Body broadly ovoid; mean total length 3.61, mean width pronotum 1.44. COLORATION (pl. 2): **Head**: Uniformly castaneous; scapus unicolorous dark; pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum, scutellum, and hemelytron unicolorous castaneous; markings on cuneus absent; membrane and veins very strongly fumose; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous dark. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space relatively large; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 19): **Endosoma**: Primary strap apically greatly elongate, nearly straight, apex spadelike, otherwise without ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, fused with primary strap, ornamented with denticles; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present and erect, parallel to primary endosomal strap; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface with a curving, posteriorly directed, platelike projection; ventral surface with a projecting keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially elongate and broadly rounded; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex with short fingerlike process.

Female: Body shape as in male; mean total length 3.84, mean width pronotum 1.55. COLORATION (pl. 2): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the dark coloration, from the Latin *castanea*, "chestnut."

HOSTS: *Melaleuca undulata* Benth. (Myrtaceae).

DISTRIBUTION (map 3): Recorded from one locality in southwestern Western Australia.

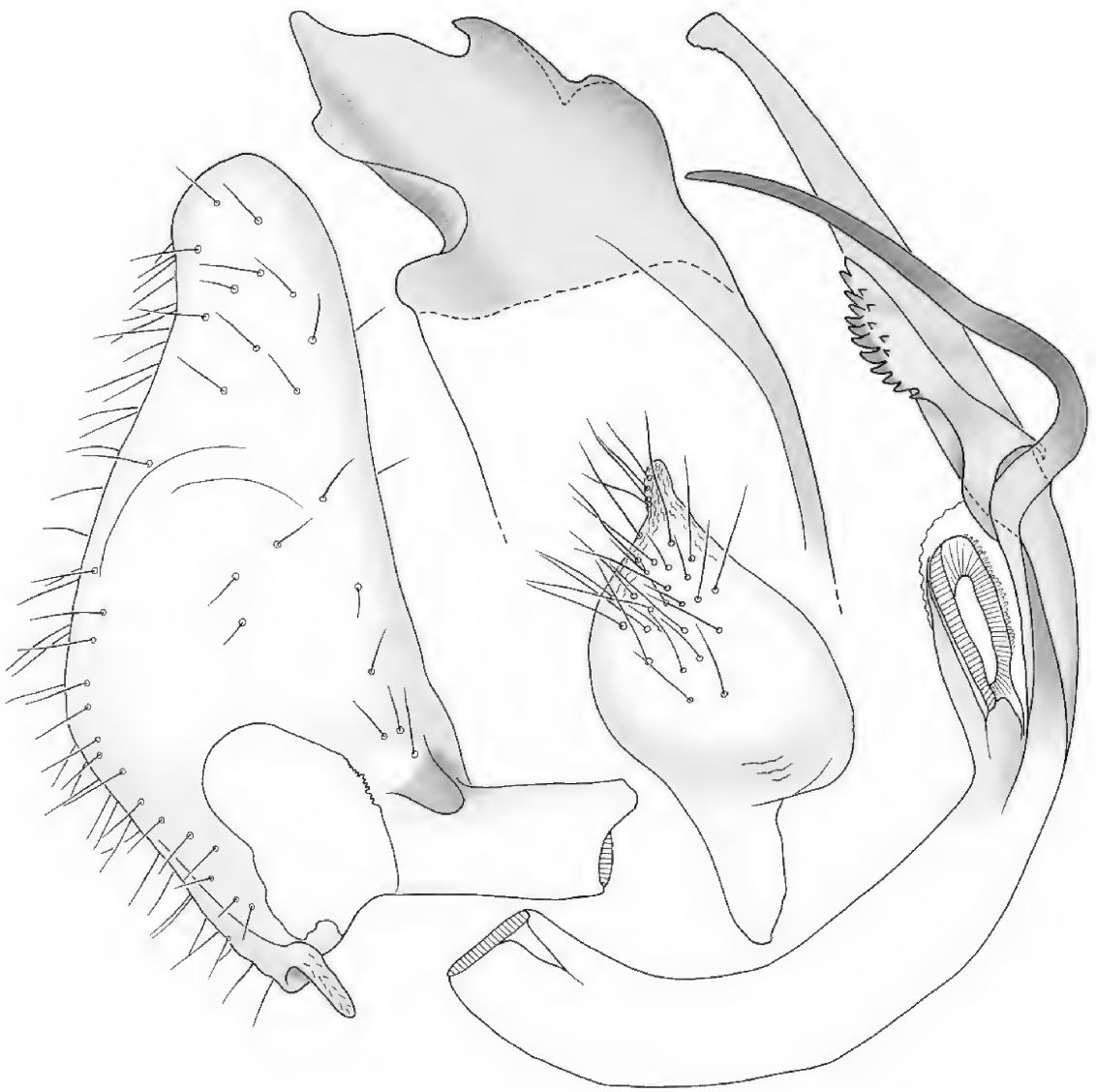


Fig. 19. *Melaleucoides castanea*, male genitalia (AMNH_PBI 00087372).

HOLOTYPE: **AUSTRALIA: Western Australia:** 4 km W of Lillian Stoke Rock, 33.079°S 120.0669°E, 370 m, 21 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca undulata* Benth. (Myrtaceae), det. Perth 05671930, 1♂ (AMNH_PBI 00087372) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 4 km W of Lillian Stoke Rock, 33.079°S 120.0669°E, 370 m, 21 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca undulata* Benth. (Myrtaceae), det. Perth 05671930, 1♀ (00372754) (AM), 1♀ (00327133) (AMNH), 1♀ (00087373) (WAMP).

Melaleucoides grossi, new species
Figure 20, map 4, plate 2

DIAGNOSIS: Recognized among *Melaleucoides* spp. by the relatively large size (mean total length 3.34), the monotonous pale coloration of the dorsum, and the structure of the male genitalia, notably the secondary endosomal strap dorsal to the primary strap, free, elongate, conical, and uniformly covered

with short denticles. Most similar in size and coloration to *M. cassisi* and *M. sheathiana*. Distinguished from the former by the arrangement of the endosomal denticles in a clublike fashion ventral to the primary endosomal strap, and from the latter by the strongly orange scutellum and the fusion of the primary and secondary endosomal straps distad of the secondary gonopore with the spicules placed in somewhat irregular arrangement.

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; mean total length 3.34, mean width pronotum 1.38. COLORATION (pl. 2): **Head**: Uniformly pale, weakly yellow; scapus and pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous, weakly yellow; scutellum white to weakly yellow; hemelytron, including cuneus, unicolorous weakly yellow; markings on cuneus absent; membrane weakly fumose, veins entirely red; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head**: Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 20): **Endosoma**: Primary strap apically greatly elongate, weakly angled dorsally relative to body of endosoma, no ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, free from primary strap distal to secondary gonopore, ornamented with denticles; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Smoothly curving on dorsal margin; dorsal surface with a curving, posteriorly directed, platelike projection; anterior surface with a short to elongate keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly rounded; anterior process triangular in lateral view; posterior process in the form of a long, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex with short fingerlike process.

Female: Body shape as in male; mean total length 3.75, mean width pronotum 1.46. COLORATION (pl. 2): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the collector of all known specimens, the late Gordon Gross, in recognition of his contributions to Australian heteropterology.

HOSTS: *Melaleuca* sp. (Myrtaceae).

DISTRIBUTION (map 4): Known from Wallaroo in southeastern South Australia. *Melaleucoides grossi* is one of only two species in the *Melaleucoides* genus group that occur outside Western Australia.

HOLOTYPE: **AUSTRALIA: South Australia:** North Beach, Wallaroo, 33.906°S 137.63°E, 12 Feb 1964, G.F. Gross, 1♂ (AMNH_PBI 00169227) (SAMA).

PARATYPES: **AUSTRALIA: South Australia:** North Beach, Wallaroo, 33.906°S 137.63°E, 12 Feb 1964, G.F. Gross, 2♂ (00169239, 00169240), 3♀ (00169256–00169258) (AM), 4♂ (00169219–00169220, 00169225, 00169238), 5♀ (00169215, 00169217, 00169246, 00169249, 00169253) (AMNH), 15♂ (00169221–00169224, 00169226, 00169228–00169237), 17♀ (00169209–00169212, 00169216, 00169218, 00169241, 00169243–00169245, 00169247–00169248, 00169250–00169252, 00169254–00169255) (SAMA).

Melaleucoides leuropomae, new species
Figure 21, map 4, plate 2

DIAGNOSIS: Recognized by the presence of discrete small dark spots on the dorsum (pl. 2), and the structure of the male genitalia, the left paramere with a somewhat elongate, apex positioned more or less symmetrically and the posterolateral shoulder with a low projection; endosoma with a long row of heavy, elongate denticles on the

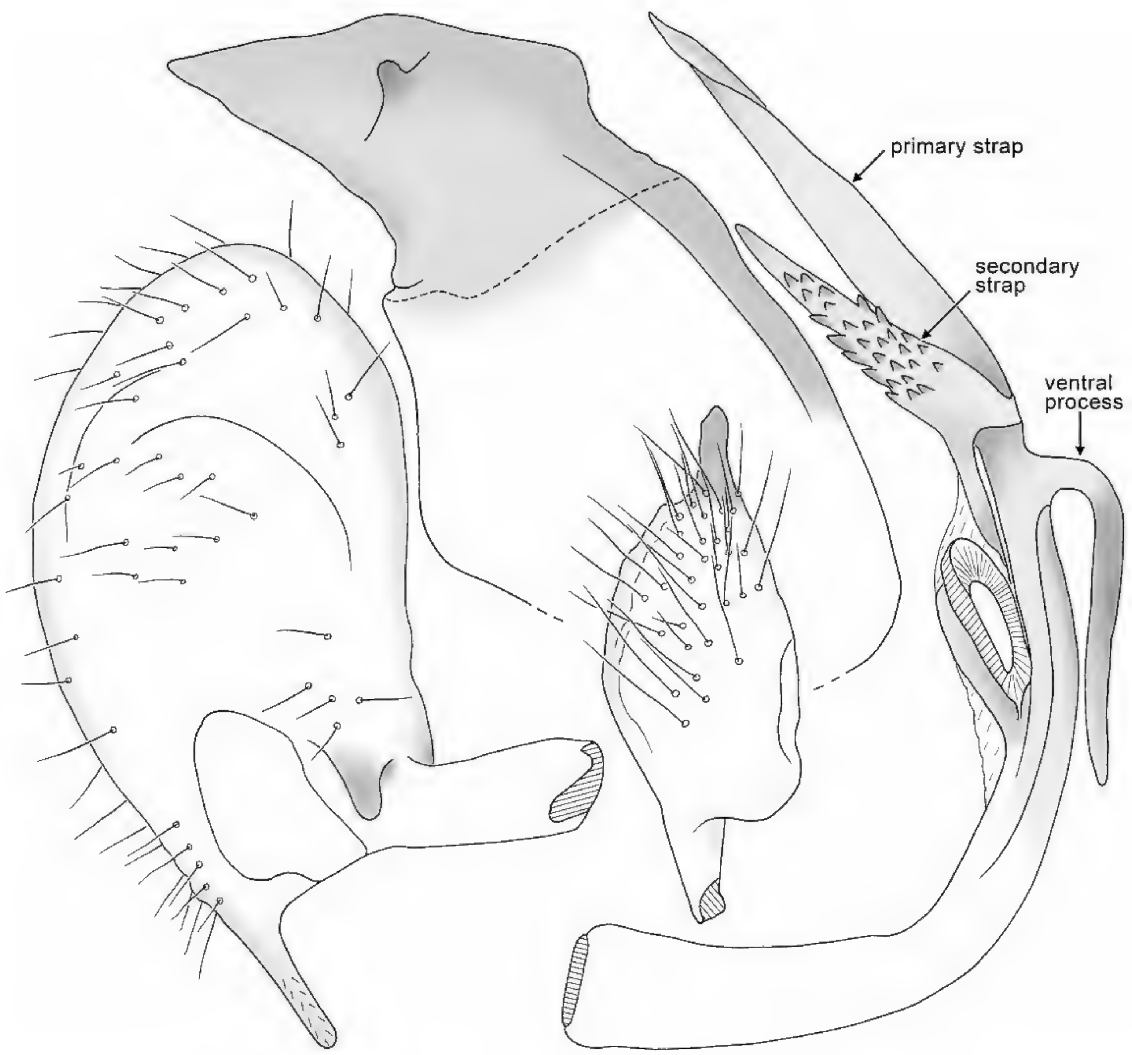


Fig. 20. *Melaleucoides grossi*, male genitalia (AMNH_PBI 00169233).

postgonoporal portion of the secondary strap and recurved ventral process associated with the secondary gonopore. Most easily confused with *M. micranthae* on the form of the spots and the structure of the male genitalia, but the spots in that species sometimes larger, the apical medial process of the left paramere more nearly symmetrically placed, and the row of denticles on the secondary endosomal strap shorter a and in the form of a more condense grouping. Spots on the dorsum of *M. beaufortiae* always somewhat coalescent and those in *M. brevifoliae* tiny and much more numerous.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 3.25, mean width pronotum 1.25. COLORATION (pl. 2): **Head**: Pale with heavy dark dots; scapus unicolorous pale; pedicellus dirty yellow proximally, weakly to heavily infuscate distally; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum pale with heavy dark spots; scutellum pale with brown spots; hemelytron unicolorous pale with scattered dark spots; markings on cuneus present as weakly darkened apex; membrane weakly fumose, veins pale; hind femur with many brown or black spots; hind

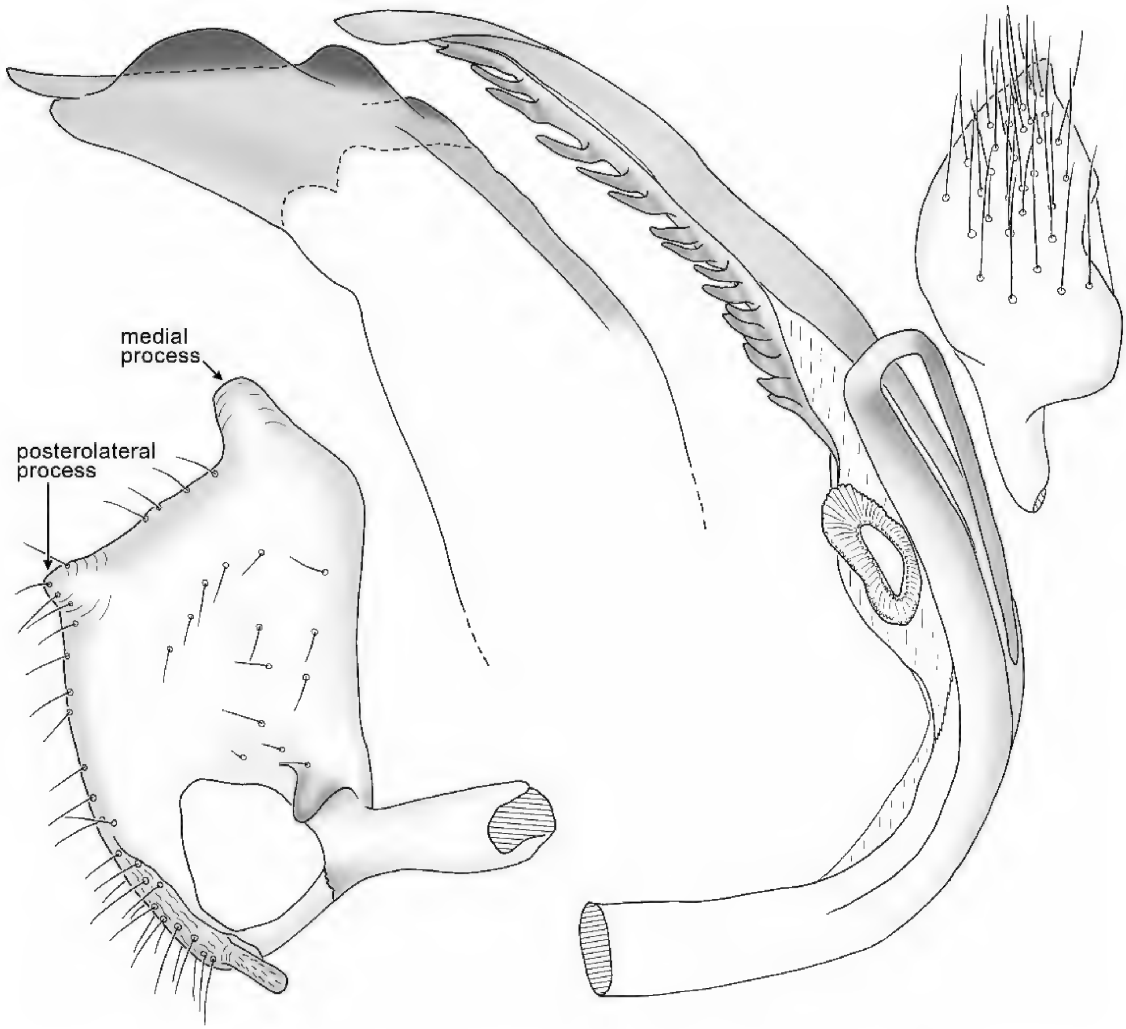


Fig. 21. *Melaleucoides leuropomae*, male genitalia (AMNH_PBI 00137076).

tibial spines black with conspicuous dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space relatively large; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with dorsal margin somewhat below ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 21): **Endosoma**: Primary strap apically greatly elongate, without ornamentation, extreme apex curving dorsally; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, with a comblike edge; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, strongly recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in later-

al view of endosoma. **Phallotheca**: Nearly erect; anterior surface with a short to elongate keel; apex simple. **Left Paramere**: Shaft at right angles to body; body more or less quadrate; apex medially drawn into a blunt fingerlike process; apex posterolaterally with a low shoulder; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.46, mean width pronotum 1.32. COLORATION (pl. 2): As in male. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular, with sclerotized guide present as short heavily sclerotized tube on left side.

ETYMOLOGY: Named for the host species, *Melaleuca leuropoma* (Myrtaceae).

HOSTS: Most known specimens were taken on *Melaleuca leuropoma* L.A. Craven (Myrtaceae) (pl. 5C). Additional specimens are recorded from the following species of Myrtaceae: *Melaleuca conothamnoides* C.A. Gardner, *Melaleuca viminea* Lindl., and *Phymatocarpus porphyrocephalus* F. Muell.

DISTRIBUTION (map 4): Known from several localities in Western Australia, including one locality in the Wheatbelt region and coastal areas north to Kalbarri.

HOLOTYPE: **AUSTRALIA: Western Australia:** Kalbarri National Park, 7 km E of Kalbarri, 27.68008°S 114.2386°E, 400 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca leuropoma* L.A. Craven (Myrtaceae), det. Perth 05879175, 1♂ (AMNH_PBI 00137075) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 15 km E of Merredin, 31.37749°S 118.6933°E, 330 m, 16 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca conothamnoides* C.A.Gardner (Myrtaceae), det. PERTH staff PERTH 05670624, 3;m (AMNH_PBI 00087325, AMNH_PBI 00087534, AMNH_PBI 00372261), 4;f (AMNH_PBI 00087326, AMNH_PBI 00372262 - AMNH_PBI 00372264) (AM). Brand Hiway 45.9 km S of Dongarra Road, 29.57703°S 115.1348°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Phymatocarpus porphyrocephalus* F. Muell. (Myrtaceae), det. PERTH staff PERTH 05879264, 1;m (AMNH_PBI 00087192), 1;f (AMNH_PBI 00087193) (AM), 2;m (AMNH_PBI 00130199, AMNH_PBI 00130200), 1;f (AMNH_PBI 00130201) (AMNH). Cervantes, 30.49902°S 115.0684°E, 3 m, 10 Dec 1997, Schuh, Brailovsky, *Melaleuca viminea* Lindl. (Myrtaceae), det. PERTH staff PERTH 05879205, 1;f (AMNH_PBI 00181857) (AMNH), 3;f (AMNH_PBI 00130552, AMNH_PBI 00181855 - AMNH_PBI 00181856) (WAMP). Kalbarri National Park, 7 km E of Kalbarri, 27.68008°S 114.2386°E, 400 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca leuropoma* L. A. Craven (Myrtaceae), det. PERTH staff PERTH 05879175, 8;m (AMNH_PBI 00137073 - AMNH_PBI 00137074, AMNH_PBI 00137076 - AMNH_PBI 00137081), 16;f (AMNH_PBI 00137082 - AMNH_PBI 00137097) (AMNH), 1;m (AMNH_PBI 00130202), 3;f (AMNH_PBI 00137098, AMNH_PBI 00137320 - AMNH_PBI 00137321) (WAMP). Kalbarri National Park, 22.9 km E Kalbarri, 27.75408°S 114.3711°E, 500 m, 29 Oct 1996, Schuh and Cassis, 3;m (AMNH_PBI 00135363 - AMNH_PBI 00135365), 1;f (AMNH_PBI 00135366) (WAMP).

Melaleucoides micranthae, new species
Figure 22, map 4, plate 3

DIAGNOSIS: Recognized by the presence of discrete small dark spots on the dorsum (pl. 3), and the structure of the male genitalia, the left paramere with a somewhat elongate, apex positioned somewhat asymmetrically and the posterolateral shoulder with a low projection; endosoma with a

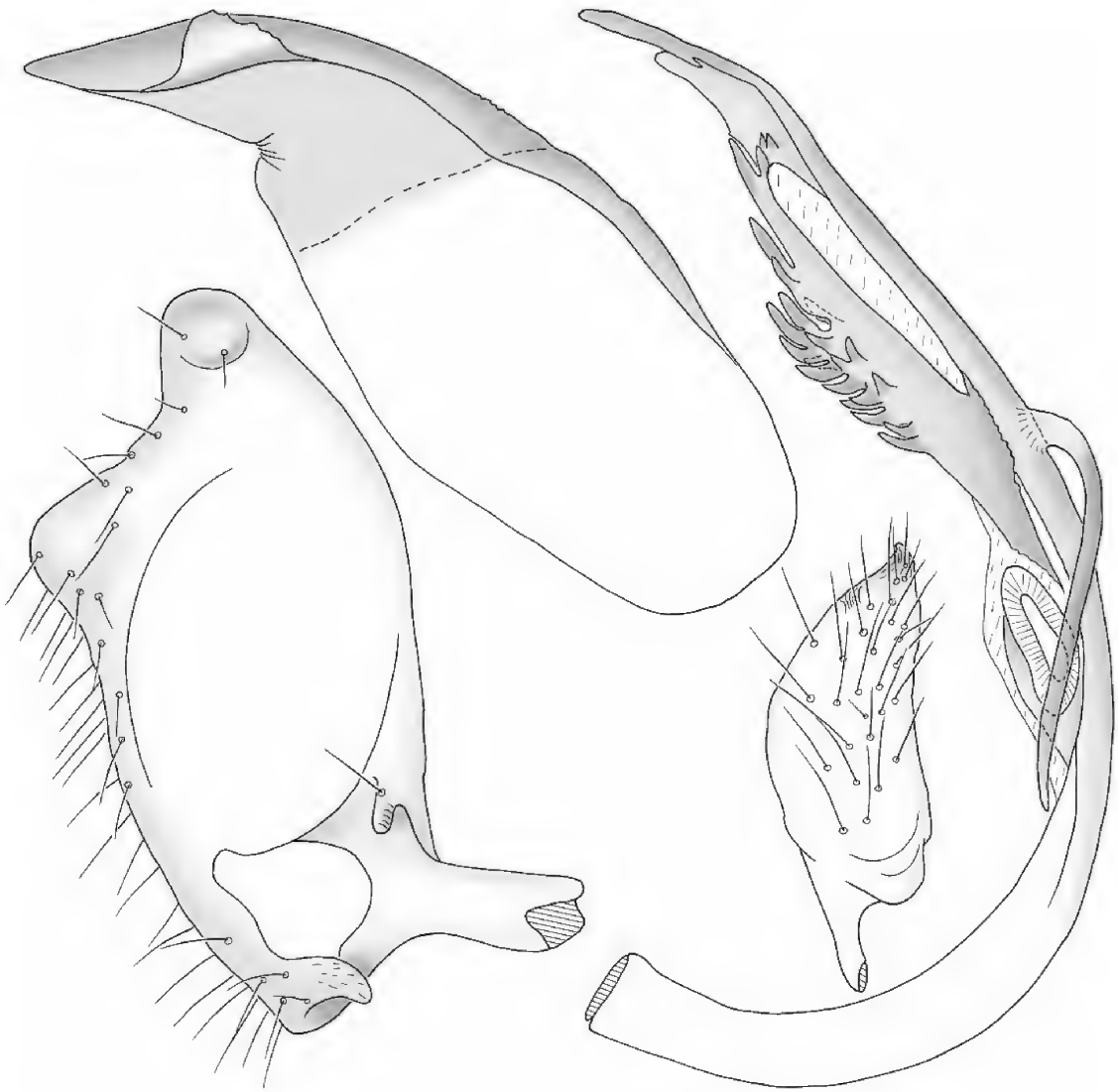


Fig. 22. *Melaleucoides micranthae*, male genitalia (AMNH_PBI 00372253).

weakly elongate, condensed grouping of heavy denticles on the postgonoporal portion of the secondary strap and recurved ventral process associated with the secondary gonopore. Most easily confused with *M. leuropomae* on the form of the spots and the structure of the male genitalia, but the spots in that species usually smaller, the apical medial process of the left paramere more strongly asymmetrical, and the row of denticles on the secondary endosomal strap longer, with the denticles more evenly spaced. Spots on the dorsum of *M. beaufortiae* always somewhat coalescent and those in *M. brevifoliae* tiny and much more numerous.

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; mean total length 3.14, mean width pronotum 1.22. COLORATION (pl. 3): **Head**: Pale with a few dark dots; scapus yellow to dirty yellow; pedicellus yellow to dirty yellow; labium uniformly pale. **Thorax**: Pronotum pale, yellowish, with a few brown spots; scutellum pale, yellowish; hemelytron unicolorous pale, yellowish, with small a few scattered dark spots; markings on

cuneus present as a weakly castaneous apex; membrane weakly fumose, veins yellow; hind femur with many brown or black spots; hind tibial spines dark with very small dark bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Barely projecting; interocular space moderate; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with dorsal margin somewhat below ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 22): **Endosoma**: Primary strap apically greatly elongate, curving dorsally near apex, no ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, fused with primary strap, and with a few heavy denticles; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, strongly recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Smoothly curving on dorsal margin; anterior surface with a short to elongate keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped, apex medially drawn into a blunt fingerlike process; apex posterolaterally with a low shoulder; anterior process slender and cylindrical in lateral view; posterior process in the form of a short, curved, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.53, mean width pronotum 1.16. COLORATION (pl. 3): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host species, *Beaufortia micrantha* (Myrtaceae).

HOSTS: *Beaufortia micrantha micrantha* Schauer (Myrtaceae).

DISTRIBUTION (map 4): Known from two localities in the Boorabbin and Wheatbelt regions in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 32 km SE of Paynes Find toward Beacon, 29.48558°S 117.7836°E, 250 m, 12 Dec 1997, Schuh, Brailovsky, 1♂ (AMNH_PBI 00131081) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 32 km SE of Paynes Find toward Beacon, 29.48558°S 117.7836°E, 250 m, 12 Dec 1997, Schuh, Brailovsky, 1♂ (00131082), 5♀ (00131083–00131087) (AMNH). 92.5 km W of Coolgardie at east side of Boorabbin National Park on Great Eastern Hwy, 31.21233°S 120.31°E, 445 m, 17 Nov 1999, R.T. Schuh and G. Cassis, *Beaufortia micrantha micrantha* Schauer (Myrtaceae), det. Perth 05671957, 5♂ (00087320, 00372252, 00372255–00372257), 5♀ (00087321, 00372265–00372268) (AM), 1♂ (00087530) (AMNH), 2♂ (00372253, 00372254), 2♀ (00372269, 00372270) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 92.5 km W of Coolgardie at east side of Boorabbin National Park on Great Eastern Hwy, 31.21233°S 120.31°E, 445 m, 17 Nov 1999, R.T. Schuh and G. Cassis, *Beaufortia micrantha micrantha* Schauer (Myrtaceae), det. Perth 05671957, 10 nymphs (00372271–00372280) (AM).

Melaleucoides ozzii, new species
Figure 23, map 4, plate 3

DIAGNOSIS: Similar in size and coloration to *Melaleucoides pileanthicola*, the total length not exceeding 3.01, and the strongly reddish clavus and posterior portion of the endocorium. Also similar to *M. akaina* in size and general coloration. Distinguished from *M. akaina* and *M. pileanthicola* by the pale coloration of the cuneus in both of those species; distinguished from *M. pileanthicola* by the strongly reddish clavus and posterior portion of the endocorium in that species as well as the structure of the endosoma. Further distinguished from *M. akaina* by short apical endosomal spine and the complete absence of processes associated with the secondary gonopore in that species.

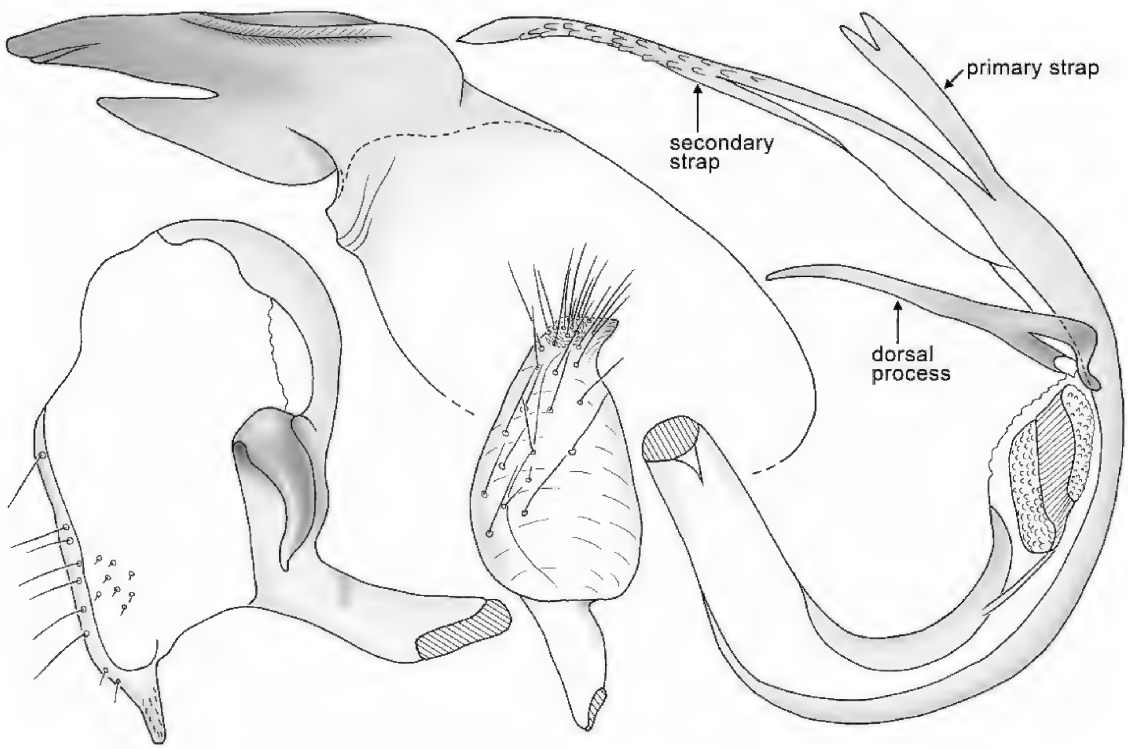


Fig. 23. *Melaleucoides ozzii*, male genitalia (AMNH_PBI 00371237).

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; mean total length 2.90, mean width pronotum 1.02. COLORATION (pl. 3): **Head**: Uniformly pale; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum pale with red or carmine blotches; scutellum white; hemelytron pale yellow with red suffusion; markings on cuneus present as a contrasting white basal fascia, remainder red; membrane weakly fumose, veins white or pale; hind femur unicolorous pale, without black spots; tibial spines with very small dark bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with reclining simple setae matching background coloration, without sericeous or woolly setae. STRUCTURE: **Head**: Moderately projecting; interocular space large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli absent. GENITALIA (fig. 23): **Endosoma**: Primary strap relatively short, straight, with a bifid apex; secondary endosomal strap free of primary strap and much longer, ornamented with denticles near apex; spinelike, elongate process arising near gonopore on dorsal surface present, erect, unornamented; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface without a fingerlike projection, and without a platelike projection; anterior surface with a short to elongate keel; ventral surface with a projecting keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly rounded to weakly quadrate; anterior process slender and cylindrical in lateral view; posterior process in the form of a short, slender, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.04, mean width prono-

tum 1.04. COLORATION (pl. 3): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the late Ozzie Massie, with thanks for his encouragement and interest in our work on the Australian Miridae fauna.

HOSTS: *Thryptomene kochii* E. Prinz. (Myrtaceae).

DISTRIBUTION (map 4): Known from one locality in the Goldfields region of Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 135 km W of Coolgardie on Great Eastern Hiway, 31.27202°S 120.0059°E, 489 m, 17 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Thryptomene kochii* E. Pritz. (Myrtaceae), det. Perth 05671302, 1♂ (AMNH_PBI 00371239) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 135 km W of Coolgardie on Great Eastern Hiway, 31.27202°S 120.0059°E, 489 m, 17 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Thryptomene kochii* E. Pritz. (Myrtaceae), det. Perth 05671302, 4♂ (00371230, 00371233, 00371236, 00371238), 5♀ (00371242, 00371245, 00371247–00371249) (AM), 3♂ (00371231, 00371234, 00371237), 3♀ (00371241, 00371243–00371244) (AMNH), 3♂ (00371229, 00371232, 00371235), 2♀ (00371240, 00371246) (WAMP).

Melaleucoides pileanthicola, new species
Figures 24, 25; map 4; plate 3

DIAGNOSIS: Similar in size and coloration to *M. ozzii*, the total length not exceeding 3.01 and the strongly reddish clavus and posterior portion of the endocorium. Also similar to *M. akaina* in size and general coloration, but distinguished from that species by the short apical endosomal spine and the absence of processes associated with the secondary gonopore and from *M. ozzii* by the distinctive apical endosomal spine and red cuneus in that species.

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; mean total length 2.72, mean width pronotum 0.97. COLORATION (pl. 3): **Head**: Uniformly pale, yellow orange; scapus and pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous yellow orange; scutellum entirely red to brown; hemelytron with most of endocorium carmine; cuneus pale; membrane and veins strongly fumose; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 24C): Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 24A): Moderately projecting; interocular space large; eyes leaving gena only very slightly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (fig. 24D): Pulvilli absent. GENITALIA (figs. 24E, F, 25): **Endosoma**: Primary strap apically greatly elongate, weakly arcuate and curving dorsally, no ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, devoid of ornamentation, free from primary endosomal strap; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present and erect, oriented toward apex of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface with a curving, posteriorly directed, platelike projection; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly; anterior process triangular in lateral view; posterior process in the form of a long, straight, fingerlike projection; base of posterior process with slightly projecting shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Body shape as in male; mean total length 2.94, mean width pronotum 1.01. COLORATION (pl. 3): As in male. GENITALIA (fig. 25): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold

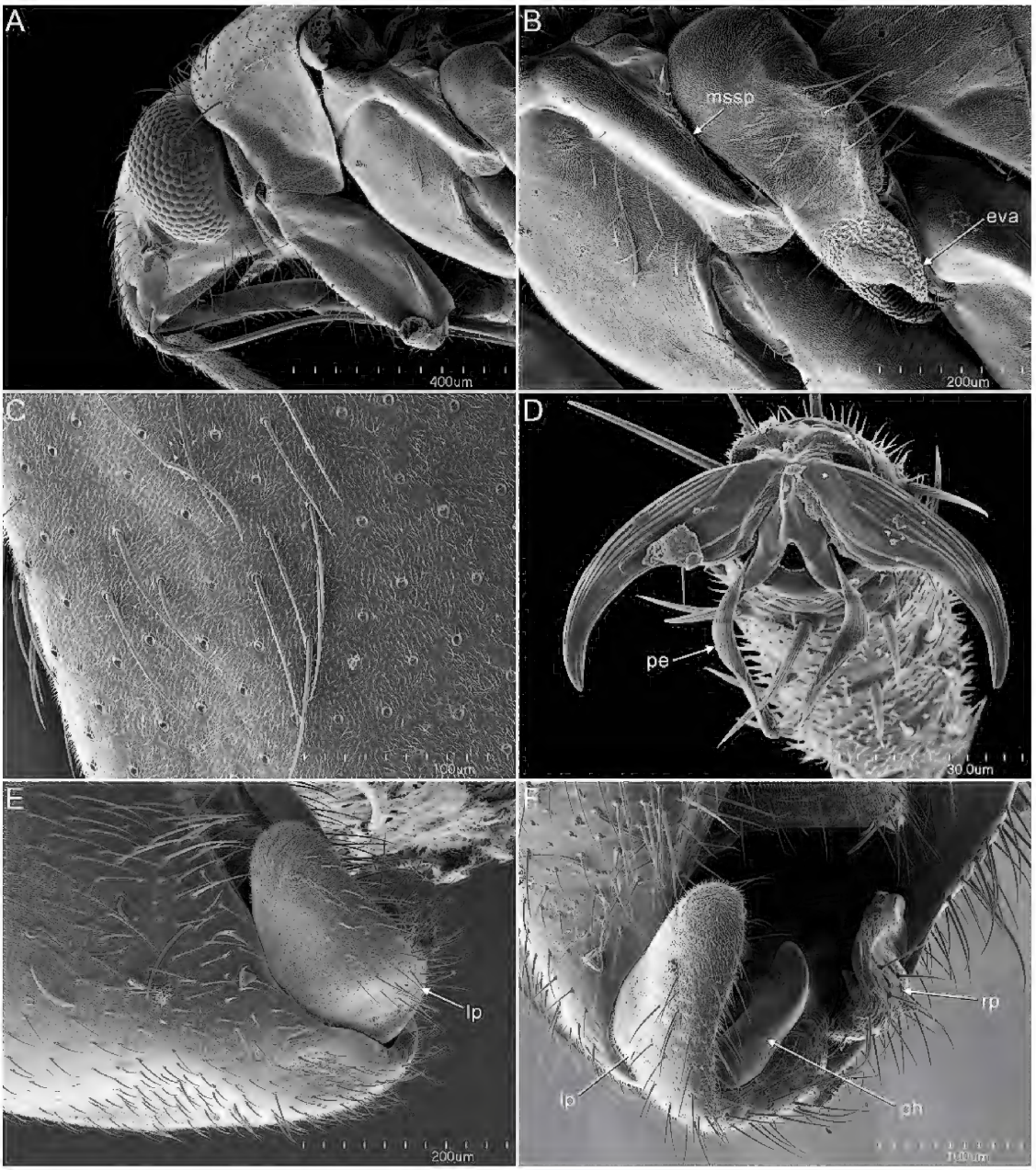


Fig. 24. *Melaleucoides pileanthicola*, male. Scanning electron micrographs. **A.** Head, pro-, and mesothorax, lateral view. **B.** Meso- and metathorax, lateral view. **C.** Setae on hemelytra. **D.** Pretarsus, frontal view. **E.** Pygophore, lateral view. **F.** Pygophore, dorsal view. eva = evaporatory area; lp = left paramere; mssp = mesothoracic spiracle; pe = parempodium; ph = phallotheca; rp = right paramere (AMNH_PBI 00137348).

on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes roughly symmetrical, erect, and not ornamented with spicules or with a very few; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular with sclerotized guide pre-

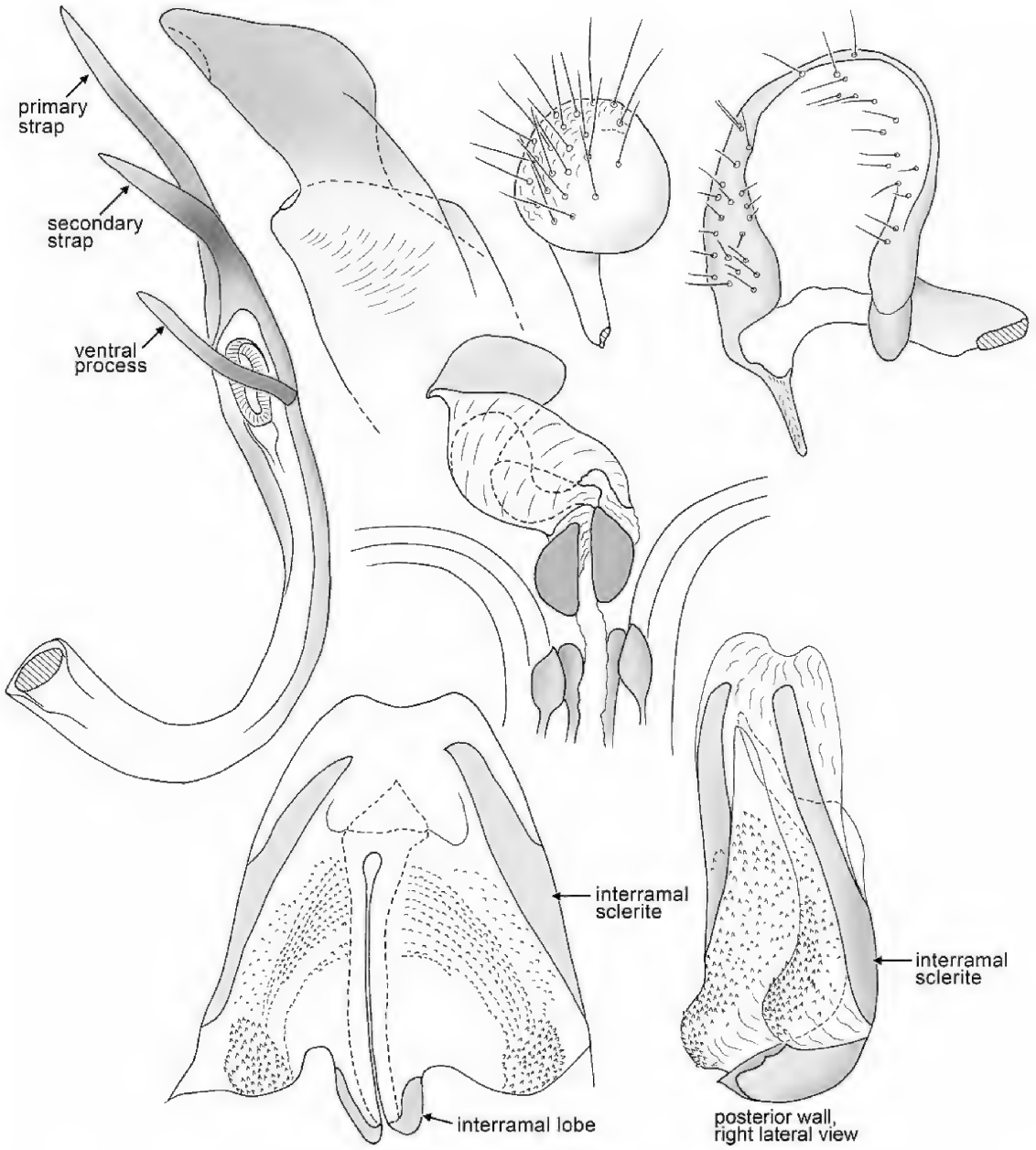


Fig. 25. *Melaleucoides pileanthicola*, male and female genitalia (AMNH_PBI 00137358, 00137396).

sent as caplike structure with internal differentiation.

ETYMOLOGY: Named for the host genus, *Pileanthus* (Myrtaceae), in combination with the Latin suffix *-cola*, "inhabitant."

HOSTS: The majority of known specimens were taken on *Pileanthus peduncularis borealis* Endl. (Myrtaceae). Additional specimens are recorded from the following species of Myrtaceae: *Pileanthus peduncularis* subsp. *pilifer* Keighery (pl. 7D), *Pileanthus vernicosus* F. Muell., *Scholtzia leptantha* Benth., *Thryptomene aspera aspera* E. Pritz. (pl. 8B).

DISTRIBUTION (map 4): Widespread in Western Australia, from the outback Goldfields to the coastal Carnarvon region.

HOLOTYPE: **AUSTRALIA: Western Australia:** NW Coastal Hiway 57 km N of Kalbarri Road, 27.44756°S 114.6867°E, 500 m, 30 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120349, 1♂ (AMNH_PBI 00137356) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 28 km S of Menzies (3.5 km E of Hiway), 29.91917°S 121.1514°E, 500 m, 25 Oct 1996, Schuh and Cassis, *Thryptomene aspera aspera* E. Pritz. (Myrtaceae), det. Perth 05095093, 4♂ (00087219, 00087510, 00373108–00373109), 2♀ (00373106, 00373107) (AM). 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area), 27.47362°S 114.7054°E, 240 m, 24 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Pileanthus vernicosus* F. Muell. (Myrtaceae), det. Field ID, 4♀ (00373119–00373122) (AM). Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120586, 7♂ (00373147–00373153), 8♀ (00373156–00373163) (AM), 2♂ (00373154, 00373155) (WAMP). NW Coastal Hiway 57 km N of Kalbarri Road, 27.44756°S 114.6867°E, 500 m, 30 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120349, 11♂ (00087215, 00373123–00373132), 9♀ (00087216, 00373136–00373143) (AM), 29♂ (00087468, 00137322–00137324, 00137329–00137353), 32♀ (00137359–00137369, 00137373–00137376, 00137379–00137380, 00137383–00137397) (AMNH), 2♂ (00137354, 00137355), 2♀ (00137377, 00137378) (CNC), 3♂ (00373133–00373135), 3♀ (00373144–00373146) (UNSW), 2♂ (00137357, 00137358), 2♀ (00137381, 00137382) (USNM), 4♂ (00137325–00137328), 11♀ (00137370–00137372, 00137398–00137405) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Scholtzia leptantha* Benth. (Myrtaceae), det. Perth6988687, 1♂ (00373175) (AM). 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area), 27.47362°S 114.7054°E, 240 m, 24 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Pileanthus vernicosus* F. Muell. (Myrtaceae), det. Field ID, 3♂ (00373116–00373118) (AM), 1♂ (00373299) (AMNH). 66.2 km E of North West Coastal Hiway on Mardathuna Rd, 24.45443°S 114.5233°E, 103 m, 01 Nov 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Pileanthus peduncularis* subsp. *pilifer* Keighery (Myrtaceae), det. Perth 6989985, 2♂ (00373110, 00373111), 1♀ (00373112) (AM).

Melaleucoides rhaphiophyllae, new species
Figure 26, map 4, plate 3

DIAGNOSIS: Most similar to *M. uncinatae* in the heavily castaneous coloration (pls. 3, 4) of the dorsum, but with the apex of the scutellum and the base of the cuneus pale. Distinguished from that species by the different form of the phallotheca and the left paramere (figs. 26, 31), the endosoma of *M. rhaphiophyllae* being unknown.

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; mean total length 2.87, mean width pronotum 1.22. COLORATION (pl. 3): **Head**: Uniformly dark; scapus brown; pedicellus unicolorous black or castaneous; labium generally infuscate, heavily so apically. **Thorax**: Pronotum unicolorous deep red to black; scutellum red or dark brown with white or pale tip; corium and clavus mostly castaneous, markings on cuneus present as a contrasting white basal fascia, remainder castaneous to black; membrane fumose, veins white; hind femur with many brown or black spots; hind tibial spines with conspicuous dark spots at bases. **Abdomen**: Venter heavily red laterally. SURFACE AND VESTITURE: Dorsum with golden reclining setae; dorsum without sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space moderate; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with dorsal margin somewhat below ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 26): **Endosoma**: All available specimens teneral and therefore not observed. **Phallotheca**: Nearly erect; dorsal surface with a fingerlike projection;

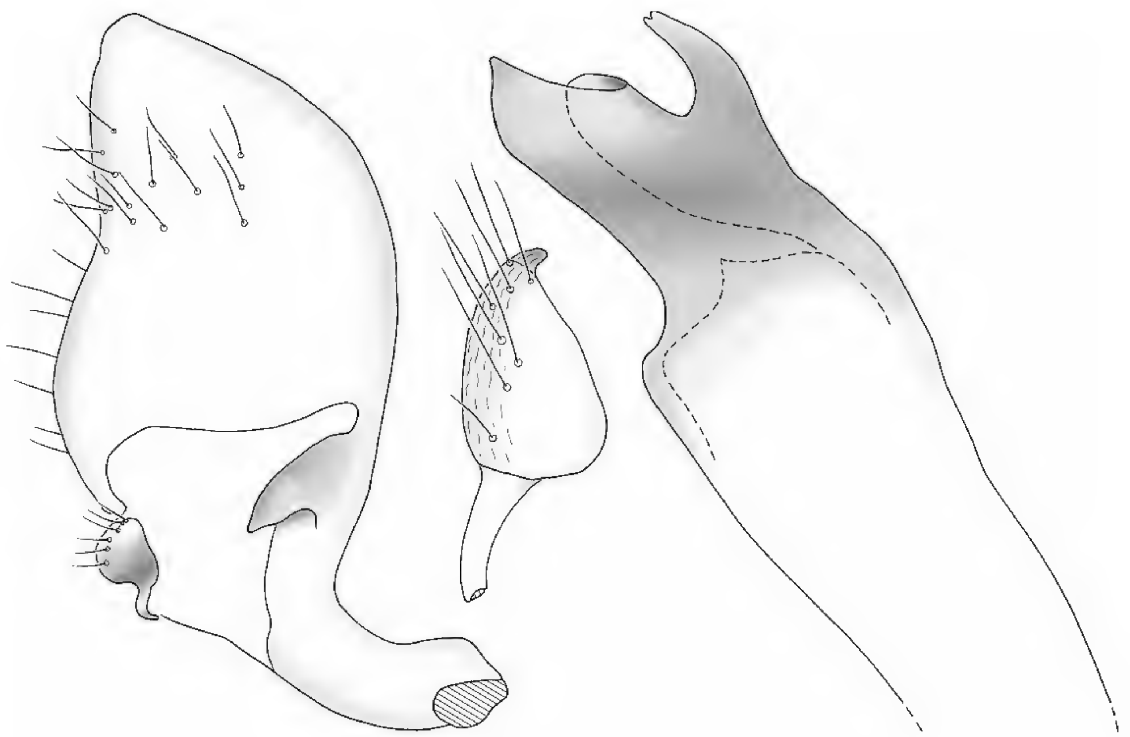


Fig. 26. *Melaleucoides rhaphiophyllae*, male genitalia (AMNH_PBI 00372295).

apex simple. **Left Paramere**: Shaft in same axis as body; body spoon shaped; apex medially angulate; anterior process triangular in lateral view; posterior process in the form of a short, curved, fingerlike projection; base of posterior process with distinct shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 2.98, mean width pronotum 1.20. COLORATION (pl. 3): Paler than male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host species, *Melaleuca rhaphiophylla* (Myrtaceae).

HOSTS: *Melaleuca rhaphiophylla* Schauer (Myrtaceae) (pl. 5D); *Melaleuca* sp.

DISTRIBUTION (map 4): Known from two localities on the Carnamah Shire Coast (obscured on the map) and the eastern agricultural region in Western Australia.

DISCUSSION: All available male specimens for this species were apparently partially teneral, because after several dissections we were unable to find a specimen in which the endosoma was suitably sclerotized for observation and illustration.

HOLOTYPE: **AUSTRALIA: Western Australia:** Brand Hiway 8.2 km N of Eneabba, 29.7462°S 115.254°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), det. Perth 05120195, 1♂ (AMNH_PBI 00128826) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** Brand Hiway 8.2 km N of Eneabba, 29.7462°S 115.254°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), det. Perth 05120195, 4♂ (00087265–00087266, 00128827, 00372296), 2♀ (00128828, 00372298) (AM), 2♂ (00372294, 00372297) (AMNH), 1♂ (00372295), 1♀ (00128829) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** Moorine Rocks, 11.7 km N of Great Eastern Hiway on

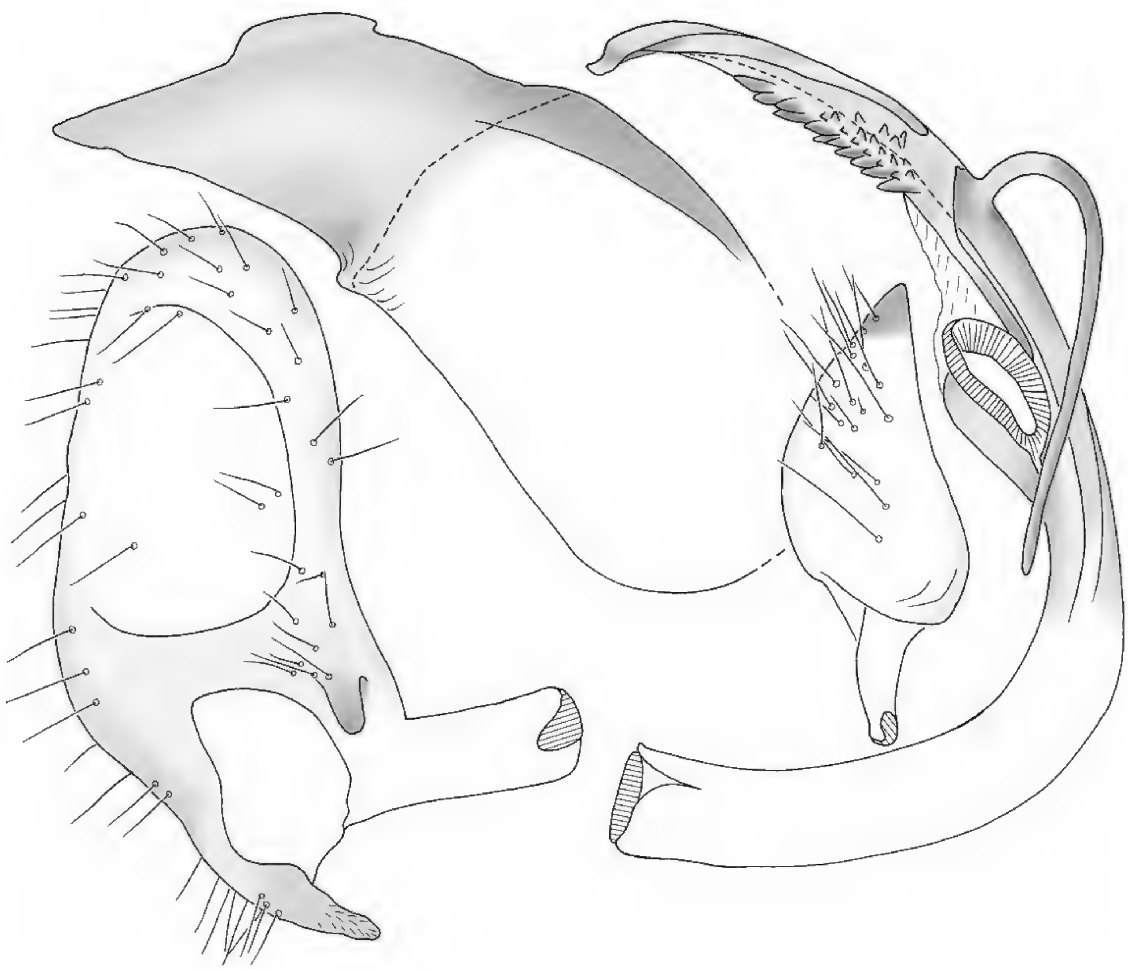


Fig. 27. *Melaleucoides sheathianae*, male genitalia (AMNH_PBI 00371561).

Noongar Road, 31.22843°S 118.979°E, 345 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca* sp. (Myrtaceae), det. field ID; host 97-06, 1♂ (00371776), 1♀ (00371777) (AMNH).

Melaleucoides sheathianae, new species
Figure 27, map 5, plate 3

DIAGNOSIS: Recognized among *Melaleucoides* spp. by the relatively large size (mean total length 3.67), the monotonous pale coloration of the dorsum in conjunction with a conspicuously orange scutellum, and the structure of the male genitalia, with the fusion of the primary and secondary endosomal straps distad of the secondary gonopore and the spicules placed in somewhat irregular arrangement. Most similar in size and coloration to *M. cassisi* and *M. grossi*. Distinguished from the former by the arrangement of the endosomal denticles in a clublike fashion ventral to the primary endosoma strap, and from the latter by the secondary endosomal strap dorsal to the primary strap, free, elongate, conical, and uniformly covered with short denticles.

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 3.67, mean width pronotum 1.37. COLORATION (pl. 3): **Head**: Uniformly dirty yellow; scapus unicolorous dark; pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous dirty yellow-green; scutellum entirely orange; hemelytron unicolorous yellow-green; mark-

ings on cuneus absent; membrane and veins weakly fumose; hind femur unicolorous pale, without black spots; hind tibial spines black without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 27): **Endosoma**: Primary strap apically greatly elongate, weakly arcuate and curving dorsally, no ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching well beyond gonopore, ornamented with denticles; spinelike, elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Smoothly curving on dorsal margin; dorsal surface with a curving, posteriorly directed, platelike projection; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly rounded; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.82, mean width pronotum 1.43. COLORATION (pl. 3): As in male. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular, with sclerotized guide present as caplike structure with internal differentiation.

ETYMOLOGY: Named for the host species, *Melaleuca sheathiana* (Myrtaceae).

HOSTS: *Melaleuca sheathiana* W. Fitz., *Melaleuca teuthidoides* Barlow (Myrtaceae).

DISTRIBUTION (map 5): Recorded from several localities in the Goldfields region of Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W. Fitzg. (Myrtaceae), det. Perth 05671396, 1♂ (AMNH_PBI 00371554) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W.Fitzg. (Myrtaceae), det. Perth 05671396, 8♂ (00087301, 00087499, 00371970–00371973, 00371975), 29♀ (00087302, 00371976, 00371978, 00371980–00371984, 00372031–00372035, 00372066–00372081) (AM), 17♂ (00129423–00129427, 00129504, 00129584–00129585, 00371552, 00371555–00371562), 36♀ (00129428–00129444, 00129505–00129512, 00129587–00129594, 00371553, 00371563–00371564) (AMNH), 3♀ (00371985–00371987) (UNSW). 91.4 km SE of Southern Cross, 31.97145°S 119.287°E, 375 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca teuthidoides* Barlow (Myrtaceae), det. Perth 05054834, 6♂ (00130795–00130800), 6♀ (00130801–00130806) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 11 km N of Coolgardie-Esperance Hiway on Kambalda Road, 31.25231°S 121.5899°E, 320 m, 18 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Melaleuca sheathiana* W. Fitzg. (Myrtaceae), det. Perth 05671396, 1♂ (00371314) (AM). 33.3 km S of Norseman, 32.46461°S

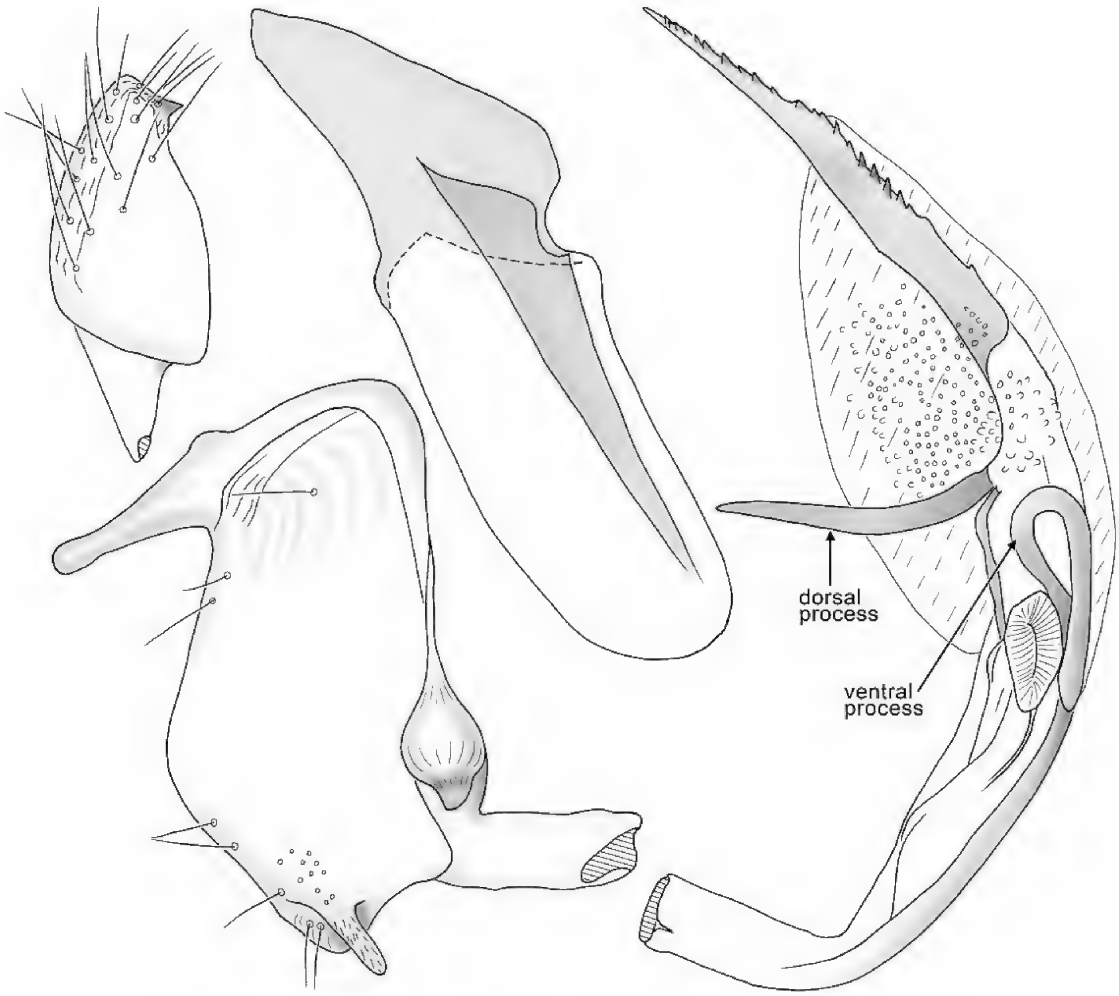


Fig. 28. *Melaleucoides similis*, male genitalia (AMNH_PBI 00087307).

121.6778°E, 300 m, 19 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, 2♂ (00371315, 00089117), 1♂ (00371966) (AM). 91.4 km SE of Southern Cross, 31.97145°S 119.287°E, 375 m, 04 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca teuthidoides* Barlow (Myrtaceae), det. Perth 05054834, 1♂ (00087308) (AM), 7♀ (00373099–00373105) (AMNH).

Melaleucoides similis, new species
Figure 28, map 5, plate 3

DIAGNOSIS: Recognized by the yellow-orange coloration of the body and appendages, the elongate slender form of the body in most specimens, and the form of the male genitalia with the elongate, fingerlike apical projection on the apex of the left paramere. Most similar in size and coloration to *M. verticordiae*, but easily distinguished by the comblike fringe on the apical spine of the endosoma in that species.

DESCRIPTION: *Male*: Body greatly elongate, parallel sided; mean total length 3.38, mean width pronotum 1.11. COLORATION (pl. 3): **Head**: Uniformly yellow; scapus and pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous yellow; scutellum

unicolorous yellow; hemelytron, including cuneus, unicolorous yellow; markings on cuneus absent; membrane weakly fumose, veins yellow; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Somewhat projecting; interocular space relatively large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. **Thorax**: *Pretarsus*: Pulvilli absent. GENITALIA (fig. 28): **Endosoma**: Primary strap apically greatly elongate, angled dorsally relative to body of endosoma, denticulate on apical half of ventral margin; secondary endosomal strap fused with primary strap primal to secondary gonopore, fused with primary strap distad of gonopore; spinelike, elongate process arising near gonopore on dorsal surface present, erect, unornamented; spinelike, elongate process near gonopore on ventral surface present, sharply recurved toward base of endosoma; bladderlike process distad of secondary gonopore present, balloonlike; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; apex simple. **Left Paramere**: Shaft at right angles to body; body more or less quadrate; apex medially broadly rounded; apex posterolaterally with a greatly elongate projection (fig. 28); anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Distinctly more ovoid than male; mean total length 3.11, mean width pronotum 1.08. COLORATION (pl. 3): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the remarkable similarity of appearance with *Melaleucoides verticordiae*, new species.

HOSTS: Recorded from *Melaleuca conothamnoides* C.A. Gardner, *Scholtzia drummondii* Benth., and *Thryptomene aspera glabra* E. Pritz. (Myrtaceae). The very limited numbers of available specimens preclude conclusions regarding host specificity in this taxon.

DISTRIBUTION (map 5): Known form the Carnamah Shire Coast near Eneabba.

HOLOTYPE: **AUSTRALIA: Western Australia:** 15 km E of Merredin, 31.37749°S 118.6933°E, 330 m, 16 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca conothamnoides* C.A. Gardner (Myrtaceae), det. Perth 0567-0624, 1♂ (AMNH_PBI 00370994) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 11 km S of Eneabba, Eneabba National Park [96-50], 29.9025°S 115.24321°E, 150 m, 01 Nov 1996, Schuh and Cassis, *Scholtzia drummondii* Benth. (Myrtaceae), det. Perth 05120209, 1♂ (00087307) (AMNH). 15 km E of Merredin, 31.37749°S 118.6933°E, 330 m, 16 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca conothamnoides* C.A.Gardner (Myrtaceae), det. Perth 05670624, 1♀ (00370993) (AM). 24 km W of Sandstone, 28.01426°S 119.0474°E, 650 m, 26 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05095182, 1♂ (00135637) (AM), *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05095182, 1♂ (00135638) (AMNH).

Melaleucoides systenae, new species
Figure 29, map 5, plate 4

DIAGNOSIS: Males recognized in most specimens by the castaneous pronotum anterior lobe, scutellum, and posterior half of the endocorium; phallotheca with a very broad reflexed flange on the dorsal margin; left paramere very broad apically; endosoma with a ventral process associated with the secondary gonopore and no denticles distad of the gonopore. Except for rather variable coloration with the taxon, *M. systenae* is not easily confused with any other known species of *Melaleucoides*.

DESCRIPTION: *Male*: Body weakly to distinctly ovoid; mean total length 3.23, mean width pronotum 1.22. COLORATION (pl. 4): **Head**: Mostly dark with pale gula and posterior head margin; scapus unicolorous dark; pedicellus black at extreme base, remainder pale; labium generally infuscate,

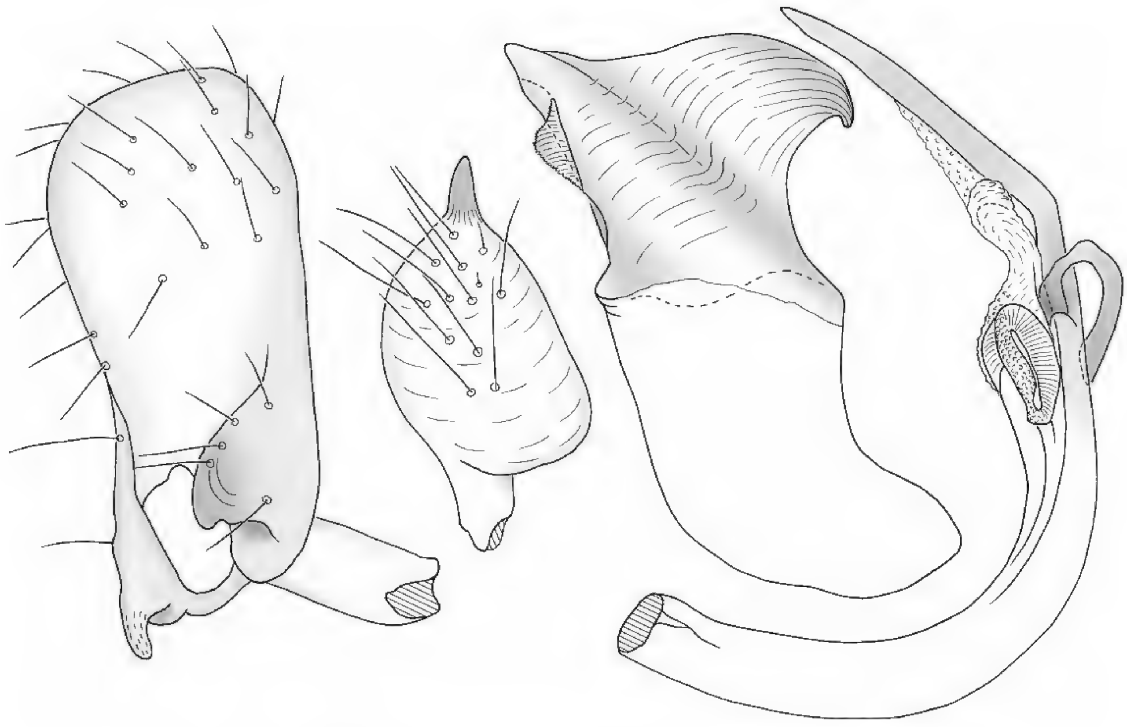


Fig. 29. *Melaleucoides systenae*, male genitalia (AMNH_PBI 00368601).

heavily so apically. **Thorax**: Pronotum usually with dark anterior lobe and contrasting lighter-colored posterior lobe; scutellum entirely dark; clavus pale, corium pale on anterior half, dark posteriorly; markings on cuneus present as a contrasting white basal fascia; membrane fumose, veins white or pale; hind femur nearly unicolorous dark; hind tibial spines dark with very small dark bases. **Abdomen**: Venter unicolorous dark. SURFACE AND VESTITURE: Dorsum with suberect or reclining black setae, without sericeous or woolly setae. STRUCTURE: **Head**: Weakly projecting; interocular space relatively large; eyes leaving gena broadly exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 29): **Endosoma**: Primary strap apically elongate, angled dorsal relative to body of endosoma, without ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching only to level of secondary gonopore; spinelike elongate process arising near gonopore on dorsal surface absent; spinelike, elongate process near gonopore on ventral surface present, relatively short, recurved toward base of endosoma; bladderlike process distad of secondary gonopore present, elongate, and paralleling primary endosomal strap; secondary gonopore seen frontally (facing up) in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface with a curving, posteriorly directed, platelike projection; ventral surface with a projecting keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex quadrate; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process without conspicuous shoulder. **Right Paramere**: Body short and broad, lanceolate; apex with short fingerlike process.

Female: Slightly more ovoid than male; mean total length 3.51, mean width prono-

tum 1.32. COLORATION (pl. 4): Paler than male, more strongly reddish, without the nearly castaneous quality of most males. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes present and asymmetrical, reclining, overlapping, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular, with sclerotized guide present as short heavily sclerotized tube on left side.

ETYMOLOGY: Named for the host species, *Melaleuca systena* (Myrtaceae).

HOSTS: *Melaleuca laetifica* Craven [ms. name] (pl. 5B), *Melaleuca systena* Craven, *Melaleuca urceolaris* Benth., *Melaleuca viminea* Lindl., and *Phymatocarpus porphyrocephalus* F. Muell. (Myrtaceae).

DISTRIBUTION (map 5): Relatively widespread in Western Australia, with localities ranging from the Nullabor Plain in the southeast to Kalbarri National Park in the north.

HOLOTYPE: **AUSTRALIA: Western Australia:** 8.2 km E of Indian Ocean Rd on Coorow-Greenhead Rd, Lesuer National Park, 30.04767°S 115.0551°E, 30 m, 06 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Melaleuca systena* Craven (Myrtaceae), det. Perth 6990401, 1♂ (AMNH_PBI 00368603) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 8.2 km E of Indian Ocean Rd on Coorow-Greenhead Rd, Lesuer National Park, 30.04767°S 115.0551°E, 30 m, 06 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Melaleuca systena* Craven (Myrtaceae), det. Perth6990401, 2♂ (00368602, 00368604), 3♀ (00368606–00368608) (AM), 2♂ (00368600, 00368601), 3♀ (00368609–00368610, 00368613) (AMNH) 2♀ (00368617, 00368618) (UNSW), 3♀ (00368614–00368616) (WAMP). Brand Hiway 45.9 km S of Dongarra Road, 29.57703°S 115.1348°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Phymatocarpus porphyrocephalus* F. Muell. (Myrtaceae), det. Perth 05879264, 2♂ (00130029, 00130030), 3♀ (00130031–00130033) (AMNH). Cervantes, 30.49902°S 115.0684°E, 3 m, 10 Dec 1997, Schuh, Brailovsky, *Melaleuca viminea* Lindl. (Myrtaceae), det. Perth 05879205, 1♂ (00130601), 4♀ (00130602–00130605) (AMNH), 3♀ (00130606–00130608) (WAMP). Frank Hann National Park, 37 km E of Lake King, 33.07753°S 120.0918°E, 400 m, 05 Nov 1996, Schuh and Cassis, *Melaleuca* sp. (Myrtaceae), det. Perth 05236908, 1♂ (00087405), 1♀ (00087406) (AM). Kalbarri National Park, 22.9 km E Kalbarri, 27.75408°S 114.3711°E, 500 m, 29 Oct 1996, Schuh and Cassis, 6♀ (00135367–00135372) (WAMP). Kalbarri National Park, 37.7 km E Kalbarri, 27.8482°S 114.4746°E, 500 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca laetifica* Craven ms (Myrtaceae), det. Perth 05054540, 2♂ (00135064, 00135065), 5♀ (00368631–00368632, 00368635–00368636, 00368638) (AM), 6♂ (00135059–00135063, 00135066), 11♀ (00368629–00368630, 00368633–00368634, 00368637, 00368639–00368644) (AMNH), 2♂ (00135067, 00135068), 4♀ (00368625–00368628) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 1 km S of Lillian Stoke Rock, 33.07681°S 120.0982°E, 380 m, 21 Nov 1999, R.T. Schuh and G. Cassis, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672023, 1♀ (00371784) (AM). 4.5 km S of Jurien on Indian Ocean Rd, 30.33667°S 115.069°E, 18 m, 06 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Melaleuca systena* Craven (Myrtaceae), det. Perth6987567, 1♀ (00371783) (AM). 8.2 km E of Indian Ocean Rd on Coorow-Greenhead Rd, Lesuer National Park, 30.04767°S 115.0551°E, 30 m, 06 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Melaleuca systena* Craven (Myrtaceae), det. Perth 6990401, 4 nymphs (00368619, 00368621, 00368623–00368624) (AM). 11 km S of Eneabba on Brand Hiway, Eneabba Reserve, 29.91094°S 115.1175°E, 100 m, 21 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Melaleuca urceolaris* Benth. (Myrtaceae), det. Perth 6986919, 5♀ (00371778–00371782) (AM). Cervantes, 30.49902°S 115.0684°E, 3 m, 10 Dec 1997, Schuh, Brailovsky, *Melaleuca viminea* Lindl. (Myrtaceae), det. Perth 05879205, 1 nymph (00372247) (AM).

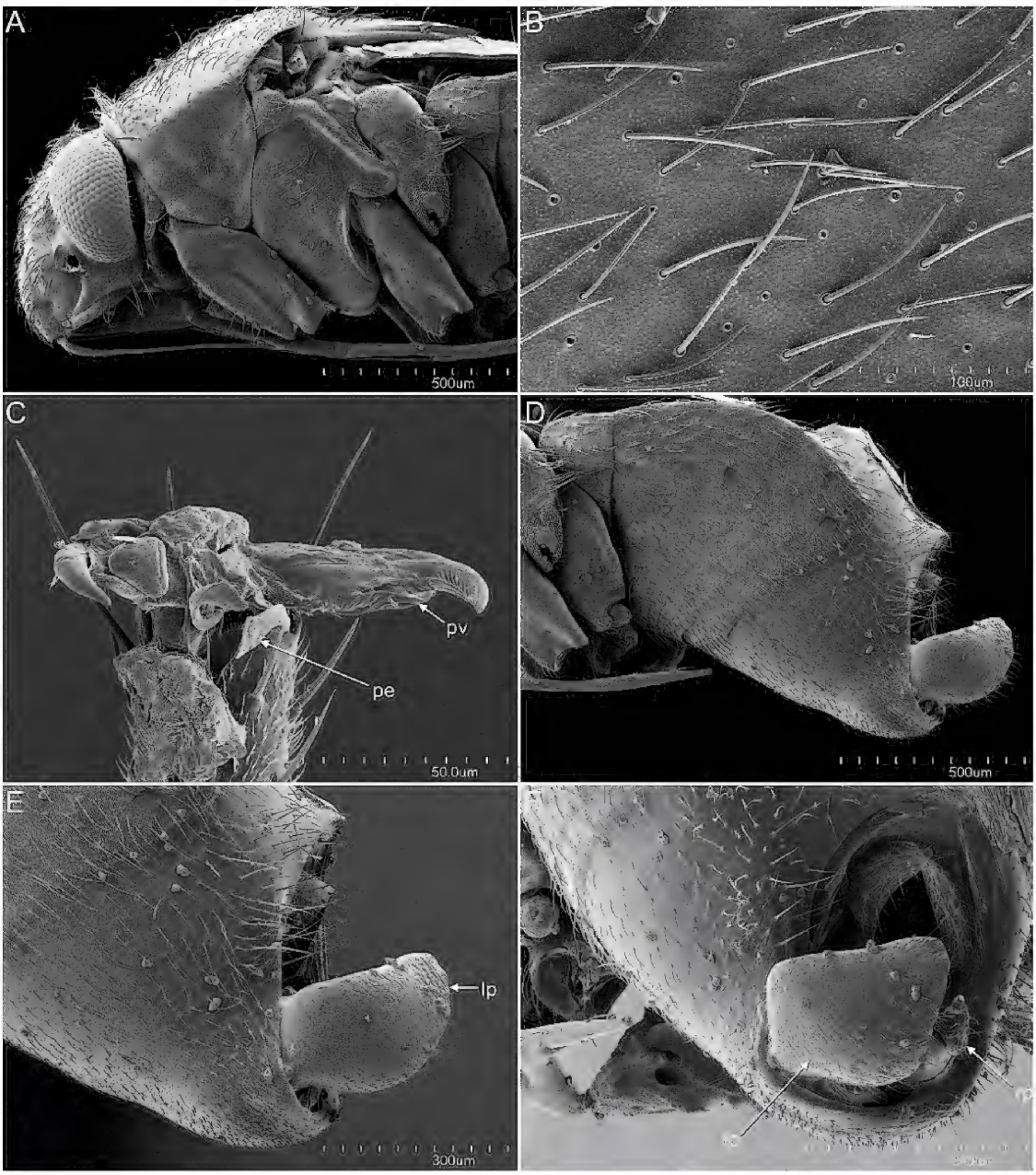


Fig. 30. *Melaleucoides uncinatae*, male. Scanning electron micrographs. **A.** Head and thorax, lateral view. **B.** Setae on hemelytra. **C.** Pretarsus, ventral view. **D.** Abdomen, lateral view. **E.** Pygophore, lateral view. **F.** Pygophore, dorsal view. lp = left paramere; pe = parempodium; pv = pulvillus; rp = right paramere (AMNH_PBI 00368327).

Melaleucoides uncinatae, new species
Figures 30, 31; map 6; plate 4

DIAGNOSIS: Most similar to *M. rhaphiophyllae* in the heavily castaneous coloration (pls. 3, 4) of the dorsum, with the apex of the scutellum and the base of the cuneus pale. Distinguished from that species by the different form of the phallotheca and the left paramere (figs. 26, 31),

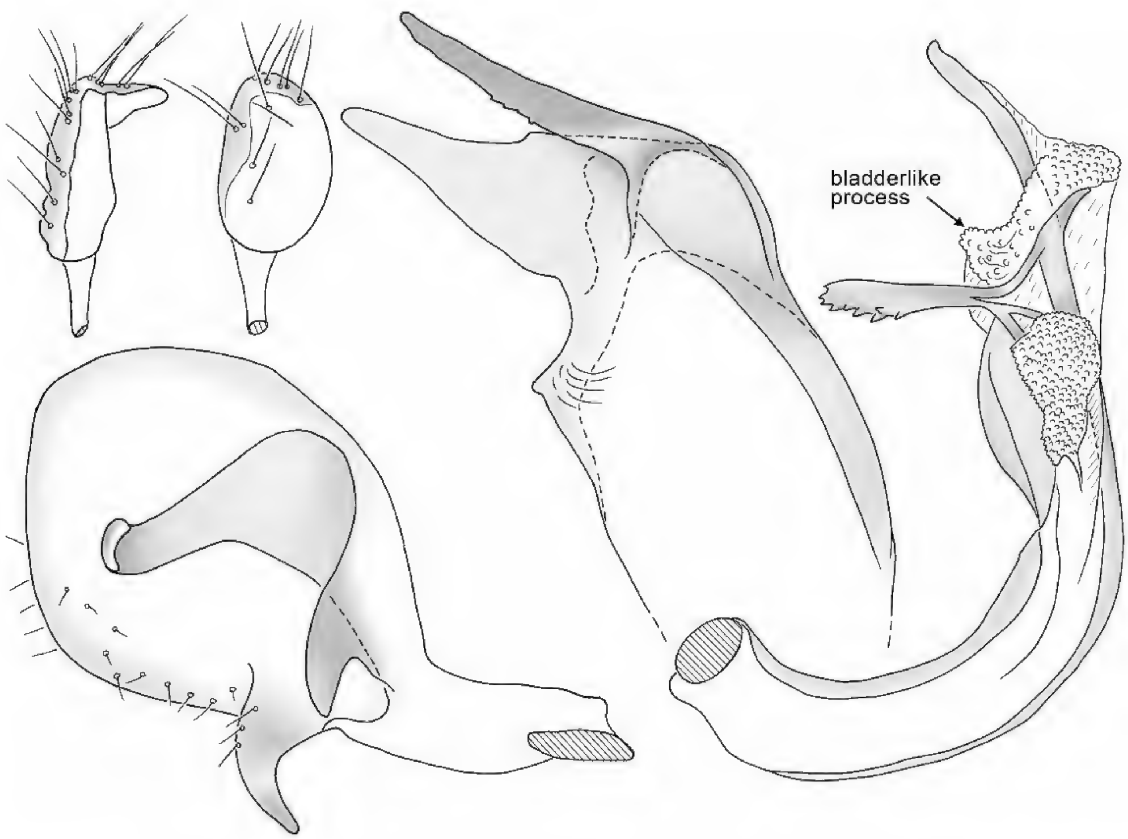


Fig. 31. *Melaleucoides uncinatae*, male genitalia (AMNH_PBI 00368328).

the endosoma of *M. rhaphiophyllae* being unknown.

DESCRIPTION: *Male*: Body moderately elongate, parallel sided; mean total length 2.99, mean width pronotum 1.25. COLORATION (pl. 4): **Head**: Uniformly dark; scapus brown; pedicellus unicolorous black or castaneous; labium generally infuscate, heavily so apically. **Thorax**: Pronotum unicolorous deep red to black; scutellum red or dark brown with white or pale tip; corium and clavus largely castaneous, markings on cuneus present as a contrasting white basal fascia, remainder castaneous; membrane strongly fumose, veins white; hind femur nearly unicolorous dark; hind tibial spines with conspicuous dark spots at bases. **Abdomen**: Venter heavily red laterally. SURFACE AND VESTITURE: Dorsum with golden reclining setae; dorsum without sericeous or woolly setae. STRUCTURE: **Head** (fig. 30A): Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus* (fig. 30C): Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (figs. 30D–F, 31): **Endosoma**: Primary strap apically weakly elongate, weakly curving, without ornamentation; secondary endosomal strap fused with primary strap proximal to level of secondary gonopore, and not projecting beyond gonopore; spinelike, elongate process arising near gonopore on dorsal surface present, erect, ornamented with denticles apically; spinelike, elongate process near gonopore on ventral surface absent; bladderlike process distad of secondary gonopore present; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: More or less right angulate; dorsal

surface with a long fingerlike projection; apex simple. **Left Paramere**: Shaft in same axis as body; body spoon shaped; apex medially broadly rounded; anterior process triangular in lateral view; posterior process in the form of a short, curved, fingerlike projection; base of posterior process with distinct shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Distinctly more ovoid than male; mean total length 3.26, mean width pronotum 1.34. COLORATION (pl. 4): Paler than male. GENITALIA: Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes roughly symmetrical, erect, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed, small, nearly symmetrical, triangular, with sclerotized guide present as short heavily sclerotized tube on left side.

ETYMOLOGY: Named for the host species, *Melaleuca uncinata* (Myrtaceae).

HOSTS: Nearly all available specimens are recorded from *Melaleuca uncinata* R. Br. (pl. 6D); a single specimen is recorded from *Melaleuca rhaphiophylla* Schauer (Myrtaceae).

DISTRIBUTION (map 6): Known from Yalgoo and Eneabba in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** 56.6 km W of Yalgoo, 28.42397°S 116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R.Br. (Myrtaceae), det. Perth 05120640, 1♂ (AMNH_PBI 00368315) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 56.6 km W of Yalgoo, 28.42397°S 116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R. Br. (Myrtaceae), det. Perth 05120640, 3♂ (00136545–00136546, 00368325), 12♀ (00136547–00136558) (AM), 14♂ (00368313–00368314, 00368316–00368324, 00368327–00368328, 00368364), 16♀ (00368329–00368344) (AMNH), 15♂ (00368326, 00368353–00368363, 00368365–00368367) (WAMP). Brand Hiway 8.2 km N of Eneabba, 29.7462°S 115.254°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), det. Perth 05120195, 1♀ (00008726) (AM).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 56.6 km W of Yalgoo, 28.42397°S 116.1233°E, 600 m, 27 Oct 1996, Schuh and Cassis, *Melaleuca uncinata* R. Br. (Myrtaceae), det. Perth 05120640, 8♀ (00368345–00368352) (AMNH).

Melaleucoides undulatae, new species
Figure 32, map 6, plate 4

DIAGNOSIS: Recognized by the castaneous calli, the elongate red markings on the hemelytron (pl. 4), and the endosoma lacking denticles distad of the secondary gonopore, a dorsal process, and a bladderlike process just distad of the gonopore (fig. 32). Most easily confused with *M. annae* on the basis of coloration, but the red markings on the hemelytron less strongly linear in that species (pl. 1) and the endosoma with denticles on the secondary strap distad of the secondary gonopore, a recurved ventral process associated with the secondary gonopore, and no bladderlike process (fig. 13).

DESCRIPTION: *Male*: Body weakly elongate, weakly ovoid; mean total length 3.03, mean width pronotum 1.17. COLORATION (pl. 4): **Head**: Pale, clypeus dark, frons with large dark bilateral markings; scapus unicolorous pale; pedicellus unicolorous pale; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum pale with castaneous calli and humeri; scutellum pale; hemelytron pale with longitudinal castaneous stripes along veins; markings on cuneus present as a red or castaneous apex, otherwise pale; membrane weakly fumose, veins white; hind femur with many brown or black spots; hind tibial spines with conspicuous dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE: Dorsum with golden reclining setae; dorsum without sericeous or woolly setae. STRUCTURE: **Head**: Barely projecting; interocular space moderate; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 weakly tapering, more slender at base;

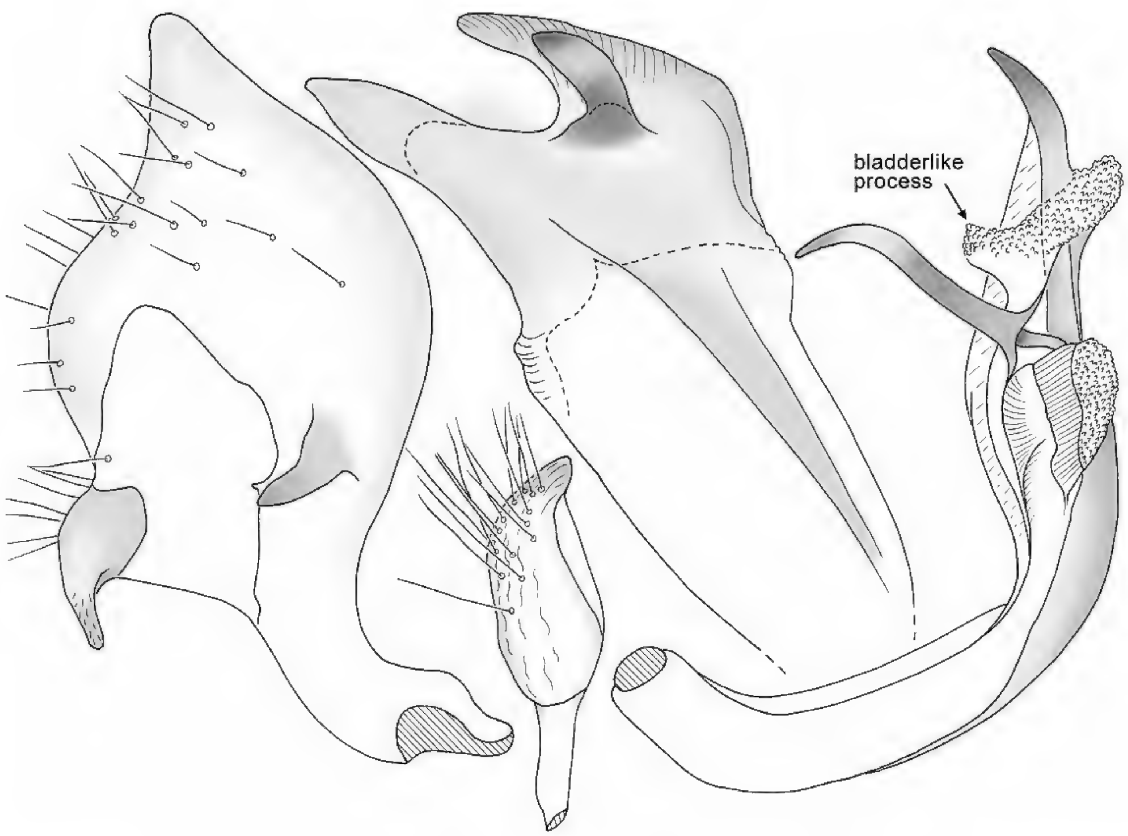


Fig. 32. *Melaleucoides undulatae*, male genitalia (AMNH_PBI 00087483).

antennal fossa with ventral margin at ventral margin of eye. *Labium*: Just reaching onto abdomen. **Thorax**: *Pretarsus*: Pulvilli present, flaplike, covering about one third of ventral claw surface. GENITALIA (fig. 32): **Endosoma**: Primary strap apically weakly elongate, weakly arcuate and curving dorsally, without ornamentation; secondary endosomal strap fused with primary strap proximal to secondary gonopore, reaching only to level of secondary gonopore; elongate process arising near gonopore on dorsal surface present, erect, curving apically, unornamented; spinelike, elongate process near gonopore on ventral surface absent; bladderlike process distad of secondary gonopore present; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: Nearly erect; dorsal surface with a fingerlike projection and a curving, posteriorly directed, platelike projection; apex simple. **Left Paramere**: Shaft in same axis as body; body spoon shaped; apex medially angulate, bluntly acuminate; anterior process slender and cylindrical in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process with distinct shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Slightly more ovoid than male; mean total length 3.27, mean width pronotum 1.25. COLORATION (pl. 4): As in male. GENITALIA: Not examined.

ETYMOLOGY: Named for the host species, *Melaleuca undulata* (Myrtaceae).

HOSTS: *Melaleuca undulata* Benth. (Myrtaceae) (pl. 6E).

DISTRIBUTION (map 6): Recorded only from Kalbarri National Park in Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Kalbarri National Park, 22.9 km E Kalbarri, 27.75408°S 114.3711°E, 500 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca undu-*

lata Benth. (Myrtaceae), det. Perth 05120403, 1♂ (AMNH_PBI 00372306) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** Kalbarri National Park, 22.9 km E Kalbarri, 27.75408°S 114.3711°E, 500 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca undulata* Benth. (Myrtaceae), det. Perth 05120403, 9♂ (00372300–00372305, 00372307, 00372310–00372311), 6♀ (00372319–00372320, 00372323, 00372326–00372328) (AM), 6♂ (00087483, 00372299, 00372308–00372309, 00372312–00372313), 5♀ (00372321–00372322, 00372324–00372325, 00372331) (AMNH), 6♂ (00087275, 00372314–00372318), 5♀ (00087276, 00372329–00372330, 00372332–00372333) (WAMP).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** Kalbarri National Park, 22.9 km E Kalbarri, 27.75408°S 114.3711°E, 500 m, 29 Oct 1996, Schuh and Cassis, *Melaleuca undulata* Benth. (Myrtaceae), det. Perth 05120403, 6 nymphs (00372334–00372339) (AM).

Melaleucoides verticordiae, new species

Figures 33, 34; map 6; plate 4

DIAGNOSIS: Recognized by the yellow-orange coloration of the body and appendages, the elongate slender form of the body in most specimens, and the form of the male genitalia with the comblike fringe on the apical spine of the endosoma. Most similar in size and coloration to *M. similis*, but easily distinguished by the elongate, fingerlike apical projection on the apex of the left paramere in that species.

DESCRIPTION: *Male*: Body greatly elongate, parallel sided; mean total length 3.49, mean width pronotum 1.19. COLORATION (pl. 4): **Head**: Uniformly yellow; scapus and pedicellus yellow to dirty yellow; labium pale with segment 4 heavily infuscate. **Thorax**: Pronotum unicolorous yellow; scutellum unicolorous yellow; hemelytron, including cuneus, unicolorous yellow; markings on cuneus absent; membrane weakly fumose, veins yellow; hind femur unicolorous pale, without black spots; hind tibial spines black, without dark spots at bases. **Abdomen**: Venter unicolorous pale or mostly so. SURFACE AND VESTITURE (fig. 33C): Dorsum with suberect or reclining black setae and some sericeous or woolly setae. STRUCTURE: **Head** (fig. 33A): Moderately projecting; interocular space large; eyes leaving gena moderately exposed in lateral view. *Antenna*: Segment 2 of equal diameter over entire length; antennal fossa with ventral margin at ventral margin of eye. *Labium*: Reaching to about anterior margin of pygophore. **Thorax**: *Pretarsus* (fig. 33D, E): Pulvilli absent. GENITALIA (figs. 33F, G, 34): **Endosoma**: Primary strap apically greatly elongate and near straight, with a comblike ventral margin; secondary endosomal strap fused with primary strap proximal to secondary gonopore, fused with primary strap distad of secondary gonopore; spinelike, elongate process arising near gonopore on dorsal surface present, erect, slender, relatively short, unornamented; spinelike, elongate process near gonopore on ventral surface present, recurved toward base of endosoma; bladderlike process distad of secondary gonopore absent; secondary gonopore seen laterally in lateral view of endosoma. **Phallotheca**: Smoothly curving on dorsal margin; ventral surface with a projecting, fingerlike keel; apex simple. **Left Paramere**: Shaft at right angles to body; body spoon shaped; apex medially broadly rounded; anterior process triangular in lateral view; posterior process in the form of a short, straight, fingerlike projection; base of posterior process with distinct shoulder. **Right Paramere**: Body short and broad, lanceolate; apex short, clawlike, decurved.

Female: Distinctly more ovoid than male; mean total length 3.59, mean width pronotum 1.24. COLORATION (pl. 4): As in male. GENITALIA (fig. 34): Posterior wall laterally with distinct crescent-shaped interramal sclerites; posteriorly without a sclerotized transverse band; posterolaterally with a distinct swelling covered with microtrichia; longitudinal fold on either side of midline along part of length; posterior margin of posterior wall without spicules and not reflexed dorsally; interramal lobes roughly symmetrical, erect, and heavily ornamented with spicules; vestibulum with medial plates sclerotized and readily observed; small, nearly symmetrical, triangular; with sclerotized guide structure present as caplike structure with internal differentiation.

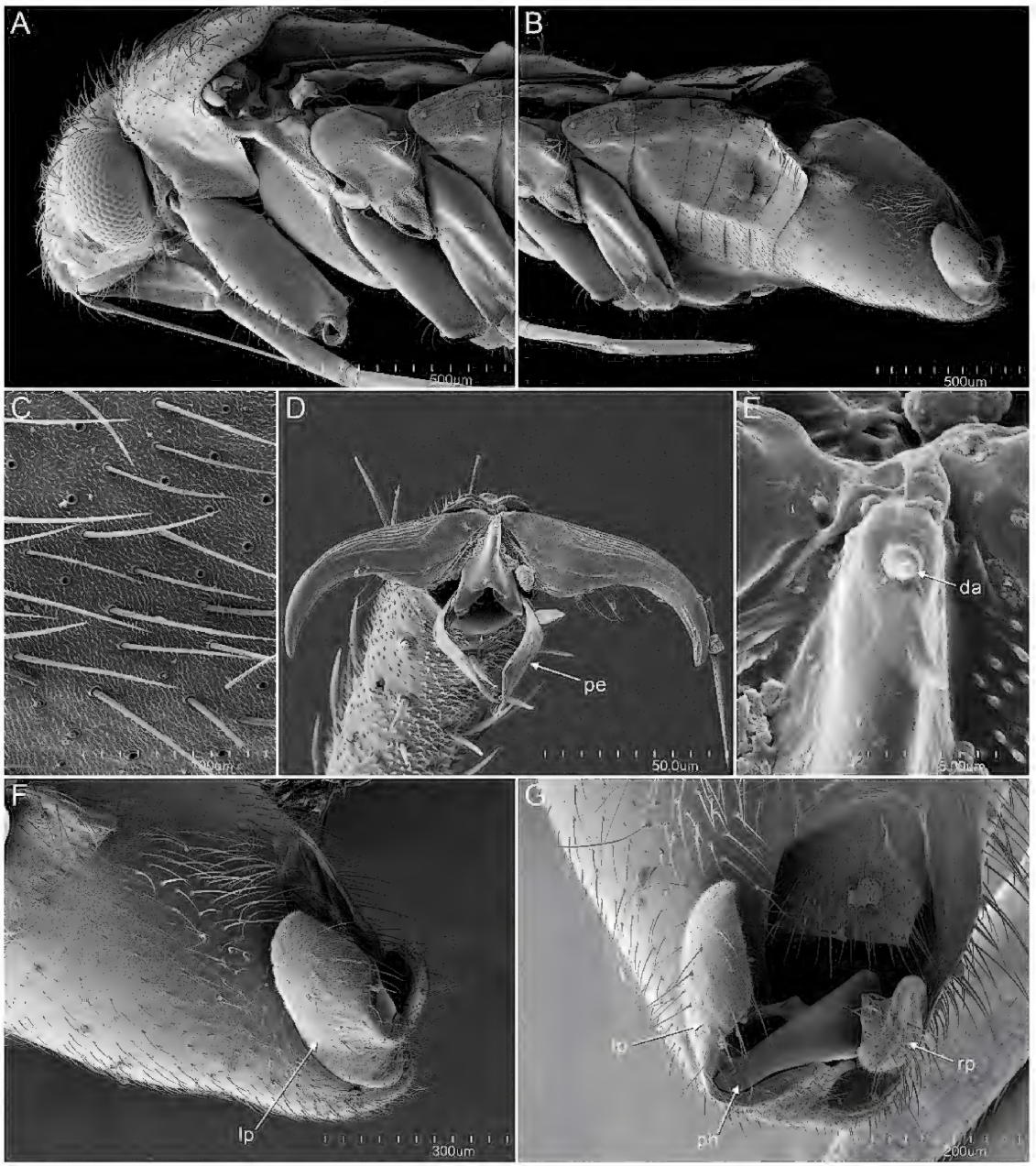


Fig. 33. *Melaleucoides verticordiae*, male. Scanning electron micrographs. **A.** Head and thorax, lateral view. **B.** Abdomen, lateral view. **C.** Setae on hemelytra. **D.** Pretarsus, frontal view. **E.** Pretarsus, frontal view, detail of rudimentary dorsal arolium. **F.** Pygophore, lateral view. **G.** Pygophore, dorsal view. da = dorsal arolium; lp = left paramere; pe = parempodium; ph = phallotheca; rp = right paramere (AMNH_PBI 00129613).

ETYMOLOGY: Named for the genus *Verticordia* (Myrtaceae), from which many of the available specimens were taken.

HOSTS: The majority of available specimens were taken from the following plant species: *Verticordia chrysantha* Endl. (pl. 8C, D), *Verticordia densiflora* Lindl., *Verticordia polytricha* Benth. (pl. 9B), and *Pileanthus peduncularis borealis* Endl. [ms. name] (pl. 7B) (Myrtaceae). Some additional taxa

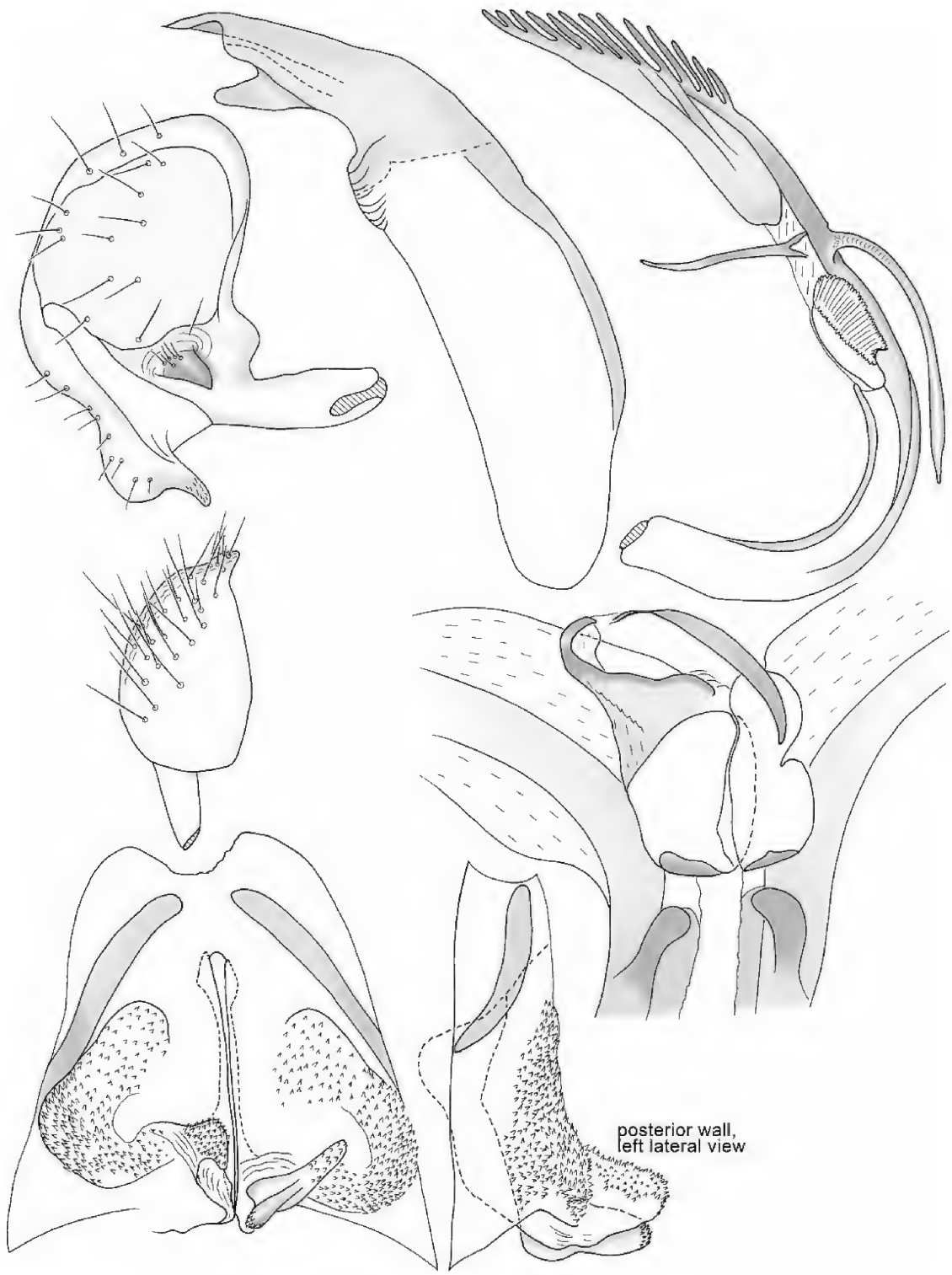


Fig. 34. *Melaleucoides verticordiae*, male and female genitalia (AMNH_PBI 00135071, 00135416).

of Myrtaceae are also recorded as hosts for much smaller numbers of specimens. The record of 21 specimens from *Allocasuarina* (Casuarinaceae) does not represent a breeding host in our view, in the face of the hundreds of specimens known only from the Myrtaceae; this is probably the result of mislabeling or commingling of specimens in the field.

DISTRIBUTION (map 6): Relatively widespread in Western Australia, ranging from south of the Goldfields in the east to Kalbarri National Park in the north.

HOLOTYPE: **AUSTRALIA: Western Australia:** NW Coastal Hiway 57 km N of Kalbarri Road, 27.44756°S 114.6867°E, 500 m, 30 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120349, 1♂ (AMNH_PBI 00135409) (WAMP).

PARATYPES: **AUSTRALIA: Western Australia:** 1 km S of Lillian Stoke Rock, 33.07681°S 120.0982°E, 380 m, 21 Nov 1999, R.T. Schuh and G. Cassis, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672023, 1♂ (00368814) (AMNH). 11 km S of Eneabba, Eneabba National Park [96-50], 29.9025°S 115.24321°E, 150 m, 01 Nov 1996, Schuh and Cassis, *Allocasuarina campestris* E. Pritz. (Casuarinaceae), det. Perth 05095182, 15♂ (00372733–00372747) *Calytrix glutinosa* (Myrtaceae), 10♂ (00372349–00372358), 11♀ (00372359–00372369) *Verticordia chrysanthella* E. Pritz. (Myrtaceae), det. Perth 05095182, 3♂ (00372678–00372680) (AM), *Verticordia chrysantha* A.S. George (Myrtaceae), det. Field ID; Host 96-147, 14♂ (00135225–00135238), 11♀ (00135242–00135252) (AMNH), *Verticordia chrysantha* A.S. George (Myrtaceae), det. Field ID; Host 96-147, 3♂ (00135239–00135241), 8♀ (00135253–00135260) (WAMP). 20.6 km S of Norseman-Lake King Road on Lake King-Cascades Road, 33.16284°S 120.2813°E, 400 m, 22 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05120160, 1♂ (00372417), 3♀ (00372418–00372420) (AM), 10♂ (00129607–00129612, 00129614–00129617), 10♀ (00129621, 00129623–00129629, 00129632, 00129635) (AMNH), 3♂ (00129618–00129620), 5♀ (00129630–00129631, 00129633–00129634, 00129636) (WAMP). 123 km W of Coolgardie on Great Eastern Hiway, 31.23414°S 120.1562°E, 17 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672015, 1♂ (00372421) (AM). Eneabba on Brand Hiway, 29.80735°S 115.2699°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Verticordia densiflora* Lindl. (Myrtaceae), det. Perth 05120179, 48♀ (00372607–00372629, 00372645–00372669) *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05120160, 9♂ (00372519–00372527), 23♀ (00372528–00372541, 00372551–00372559) (AM), 26♂ (00135069, 00135071–00135075, 00137425–00137444), 33♀ (00135078–00135082, 00135085–00135088, 00137461–00137484) (AMNH), *Verticordia densiflora* Lindl. (Myrtaceae), det. Perth 05120179, 16♀ (00372630–00372637, 00372670–00372677) (UNSW), 7♀ (00372638–00372644) *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05120160, 17♂ (00137445–00137460, 00372379), 41♀ (00137485–00137502, 00137504–00137526) (WAMP). Kalbarri National Park, Loop Road, 27.56163°S 114.4376°E, 300 m, 28 Oct 1996, Schuh and Cassis, 29♀ (00372388–00372416) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 15♂ (00372450–00372464), 47♀ (00372465–00372511) (AM), *Melaleuca megacephala* F. Muell. (Myrtaceae), det. Perth 05120616, 6♂ (00136709–00136713, 00136715), 6♀ (00136716–00136721) *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120586, 10♂ (00135472–00135480, 00135926), 12♀ (00135481–00135492) (AMNH), 13♂ (00372374–00372378, 00372380–00372387) *Melaleuca megacephala* F. Muell. (Myrtaceae), det. Perth 05120616, 7♀ (00136722–00136728) *Pileanthus peduncularis borealis* Endl. (Myrtaceae), det. Perth 05120586, 8♂ (00135920–00135925, 00135927–00135928), 10♀ (00135929–00135938) *Verticordia polytricha* Benth. (Myrtaceae), det. Perth 05120594, 7♀ (00372512–00372518) (WAMP). Kalbarri National Park, Z-Bend Road, 27.61971°S 114.3864°E, 500 m, 28 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Keighery ms. (Myrtaceae), det. Perth 05120586, 1♂ (00372570), 2♀ (00372571, 00372572) (AM). NW Coastal Hiway 57 km N of Kalbarri Road, 27.44756°S 114.6867°E, 500 m, 30 Oct 1996, Schuh and Cassis,

Pileanthus peduncularis borealis Endl. (Myrtaceae), det. Perth 05120349, 3♂ (00372281–00372283), 10♀ (00372284–00372293) (AM), 14♂ (00135408, 00136748–00136760), 14♀ (00135410–00135416, 00136761–00136766, 00136774) (AMNH), 11♀ (00136767–00136773, 00136775–00136778) (WAMP). ca. 1 km S of Murchison House HS, Kalbarri National Park, 27.65822°S 114.2394°E, 60 m, 23 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Pileanthus vernicosus* F. Muell. (Myrtaceae), det. Perth6988415, 4♂ (00368645–00368648), 12♀ (00368649–00368660) (AMNH).

OTHER SPECIMENS EXAMINED: **AUSTRALIA: Western Australia:** 1 km S of Lillian Stoke Rock, 33.07681°S 120.0982°E, 380 m, 21 Nov 1999, R.T. Schuh and G. Cassis, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672023, 4♂ (00372542–00372545), 4♀ (00372547–00372550), 1 nymph (00372546) (AM), 35♂ (00368815–00368835, 00368840–00368853), 46♀ (00368776–00368797, 00368802–00368813, 00368854–00368865), 4 nymphs (00368866–00368869) (AMNH), 4♂ (00368836–00368839), 4♀ (00368798–00368801) (UCR). 3.5 km E of Lillian Stoke Rock, 33.07679°S 120.132°E, 360 m, 21 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Verticordia roei* (Myrtaceae), 2♂ (00372370, 00372371), 2 nymphs (00372372, 00372373) (AM), 22♂ (00368754–00368775), 38♀ (00368716–00368753) (AMNH). 11 km S of Eneabba, Eneabba National Park [96-50], 29.9025°S 115.24321°E, 150 m, 01 Nov 1996, Schuh and Cassis, *Verticordia chrysanthella* E. Pritz. (Myrtaceae), det. Perth 05095182, 19♂ (00372681–00372699), 31♀ (00372700–00372730) (AM), *Calytrix glutinosa* Benth. (Myrtaceae), det. Perth 05120209, 26♂ (00135979–00136004), 23♀ (00136005–00136027), 1 nymph (00368898) (AMNH). 20.6 km S of Norseman-Lake King Road on Lake King-Cascades Road, 33.16284°S 120.2813°E, 400 m, 22 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672023, 1 nymph (00129622) (AMNH); 22 Nov 1999, R.T. Schuh and G. Cassis, 1♂ (00129613) (AMNH). 24 km W of Sandstone, 28.01426°S 119.0474°E, 650 m, 26 Oct 1996, Schuh and Cassis, *Thryptomene aspera glabra* E. Pritz. (Myrtaceae), det. Perth 05095182, 8♂ (00372579–00372586), 20♀ (00372587–00372606) (AM), 3♂ (00135633–00135635), 16♀ (00135639–00135654) (AMNH). 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area), 27.47362°S 114.7054°E, 240 m, 24 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Pileanthus vernicosus* F. Muell. (Myrtaceae), det. Field ID, 9♂ (00368597–00368599, 00368870–00368875), 2♀ (00368876, 00368877), 20 nymphs (00368878–00368897) *Verticordia capillaris* A.S. George (Myrtaceae), det. Perth 6989861, 6♂ (00368673–00368678), 11♀ (00368679–00368689), 2 nymphs (00368690, 00368691) (AMNH). 123 km W of Coolgardie on Great Eastern Hiway, 31.23414°S 120.1562°E, 17 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05672015, 7♂ (00372422–00372428), 21♀ (00372429–00372449) (AM). Brand Hiway 55.9 km S of Dongarra Road, 29.62934°S 115.2187°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Scholtzia drummondii* Benth. (Myrtaceae), det. Perth 05120209, 2♂ (00088976, 00088979) (AM), 3♂ (00135450, 00135453–00135454) (AMNH). Eneabba on Brand Hiway, 29.80735°S 115.2699°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Verticordia chrysantha* Endl. (Myrtaceae), det. Perth 05120160, 10 nymphs (00372560–00372569) (AM), 1 nymph (00135077) (AMNH). Kalbarri National Park, Z-Bend Road, 27.61971°S 114.3864°E, 500 m, 28 Oct 1996, Schuh and Cassis, *Pileanthus peduncularis borealis* Keighery ms. (Myrtaceae), det. Perth 05120586, 6 nymphs (00372573–00372578) (AM). ca. 1 km S of Murchison House HS, Kalbarri National Park, 27.65822°S 114.2394°E, 60 m, 23 Oct 2004, Cassis, Wall, Weirauch, Symonds, *Pileanthus vernicosus* F. Muell. (Myrtaceae), det. Perth 6988415, 12 nymphs (00368661–00368672) (AMNH). ca. 11 km S of Eneabba, Eneabba National Park, 29.90252°S 115.2432°E, 150 m, 01 Nov 1996, Schuh and Cassis, *Allocasuarina campestris* (Diels) L.A.S. Johnson (Casuarinaceae), det. Perth 05120063, 15♂ (00372733–00372747), 6♀ (00372748–00372753) (AM).

PHYLOGENETIC ANALYSIS

We prepared the matrix shown in appendix 1 as a way of creating a classification

based on synapomorphy for the taxa treated in this paper. It contains 25 in-group taxa and 15 outgroups, mostly Australian, with a species of Leucophoropterini used as the root. The selection of outgroups among Australian Phylini was informed by the studies of Weirauch (2007) on the *Polyozus* Eyles and Schuh group of genera, Soto and Weirauch (2009) on *Jiwarli*, Weirauch and Schuh (2010) on the *Xiphoidellus* and related genera, and Schuh and Pedraza (2010) on *Wallabicoris*. Outgroups include *Capecapsus tradouwensis* Schuh from South Africa and the Australian taxa *Wallabicoris ozothamni* Schuh and Pedraza, *W. pityrodii* Schuh and Pedraza, *W. spyridii* Schuh and Pedraza, *Xiphoides myersi* (Woodward), *Araucanophylus pacificus* Carvalho, *Xiphoidellus aureus* Weirauch and Schuh, *X. furvus* Weirauch and Schuh, *X. pallidus* Weirauch and Schuh, *Jiwarli heliotropium* Soto and Weirauch, *Polyozus galbanus* Eyles and Schuh, *Exocarpocoris tantulus* Weirauch, and the manuscript taxon *Protemiris conospermi*.

Seventy-five characters are included, the majority related to morphology of the male and female genitalia, but characters derived from somatic morphology and color are also included. We have treated as additive those multistate characters for which we could hypothesize some credible transformation; all other characters are treated as nonadditive. Additivities are indicated in appendix 1 in the data matrix and the character descriptions. We used TNT (Goloboff et al., 2008, 2009) for our analyses, applying both equal weights and implied weights (Goloboff, 1993) approaches to character optimization.

Our concepts for male genitalic homology used the study of Weirauch (2007) as a baseline, because the genera *Polyozus* and *Exocarpocoris* Weirauch possess features in common with the *Melaleucoides* group of genera. Nonetheless, material examined for the present study showed structural variation that was not always easily interpreted under Weirauch's (2007) homology theories. Therefore, in arriving at the matrix presented in this paper, we employed a variety of alternative codings for the endosomal spines found apically and in association with the secondary gonopore.

Our concepts of female genitalic homology were informed by the studies of Weirauch (2007), Schuh and Pedraza (2010), and Weirauch and Schuh (2010). Genera included in those studies and members of the *Melaleucoides* group of genera possess morphological features of the posterior wall that are not seen outside of the Australian fauna. Nonetheless, the correlation between those features and the novel structures found in the males is obviously in need of additional study.

Our equal-weights analysis used ratchet and drift in addition to the default sectorial search with tree fusing. Default parameters for the driven search were used with the minimum length tree set to 10. The equal-weights analysis produced a total of 10 most parsimonious trees with a length (L) of 506, consistency index (CI) of 35, and a retention index (RI) of 62. The strict consensus of those trees is shown in figure 35.

Our implied weights analysis used the same settings as above with a constant of concavity of K = 3. Stronger constants produced essentially the same results. The single resultant tree, with a fit value of 36.982, is shown in figure 36.

As a way of indicating clade support we chose the jackknife as a measure. These values are plotted at the nodes in figures 35 and 36 for percentages over 50. They were obtained by running the jackknife resampling option in TNT with resampling probability = 36, 1000 replications and otherwise identical parameters as in the initial searches. Characters and character states were mapped on the resulting trees (figs. 35, 36) using WinClada and show unambiguous changes. Homoplasy settings indicate any extra step as rendering a character homoplastic.

Both the equal-weights and the implied-weights analyses recover with strong support the *Melaleucoides* genus group and the three genera described in this paper (figs. 35–37). This grouping is supported by a number of characters, among which the fleshy structure of the parempodia (23-1) is easily recognized and apparently unique within the Australian Phylinae fauna. *Harpgophylus* is recognized as the sister group of the remaining members of the *Melaleucoides* genus group. Under our character codings none of the characters diagnostic for *Harpgophylus* is unique, but

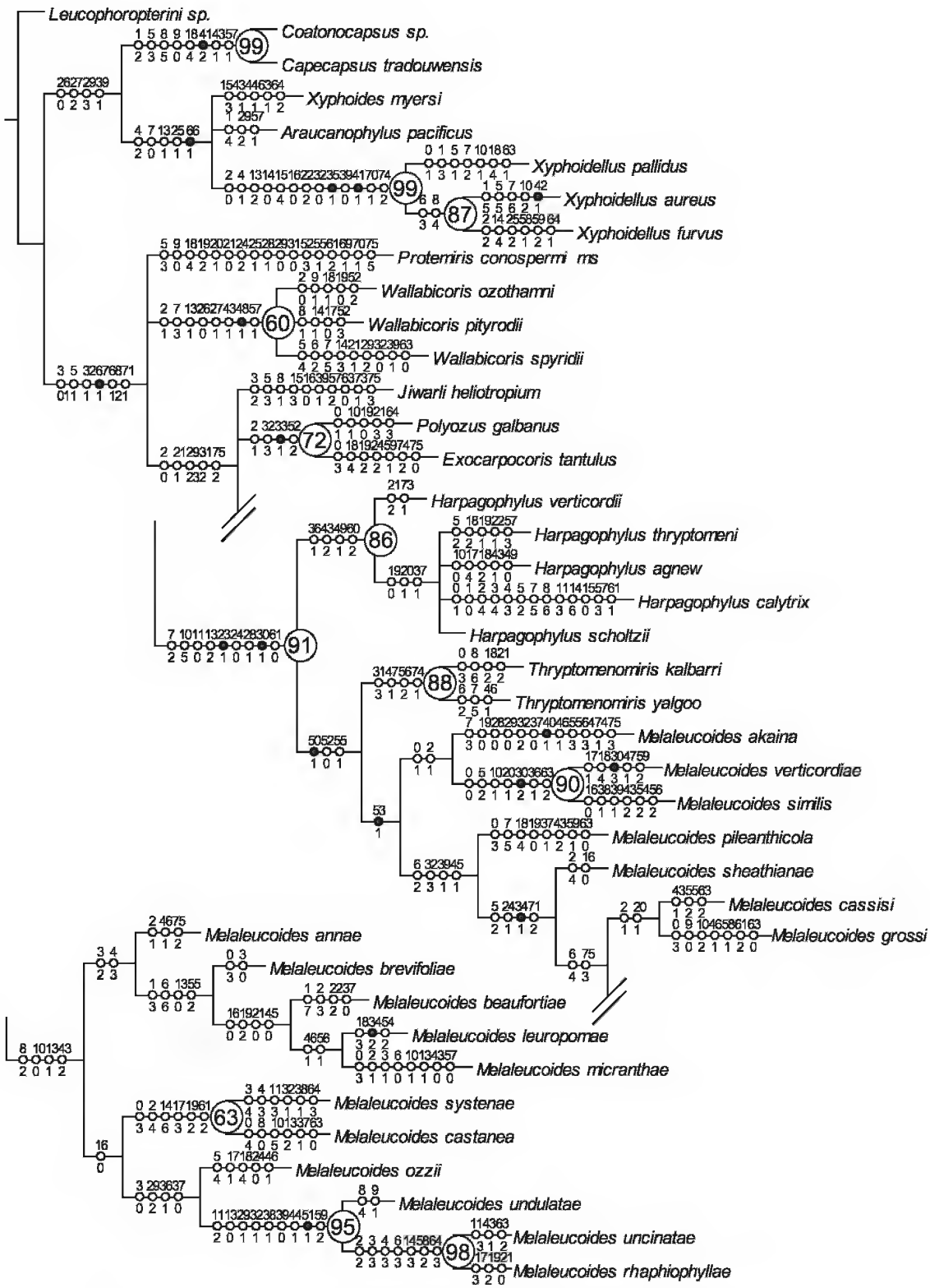


Fig. 35. Phylogenetic relationships within the *Melaleucoides* genus group based on equal weight analysis using TNT and maximum parsimony. L = 506, CI = 35, RI = 62.

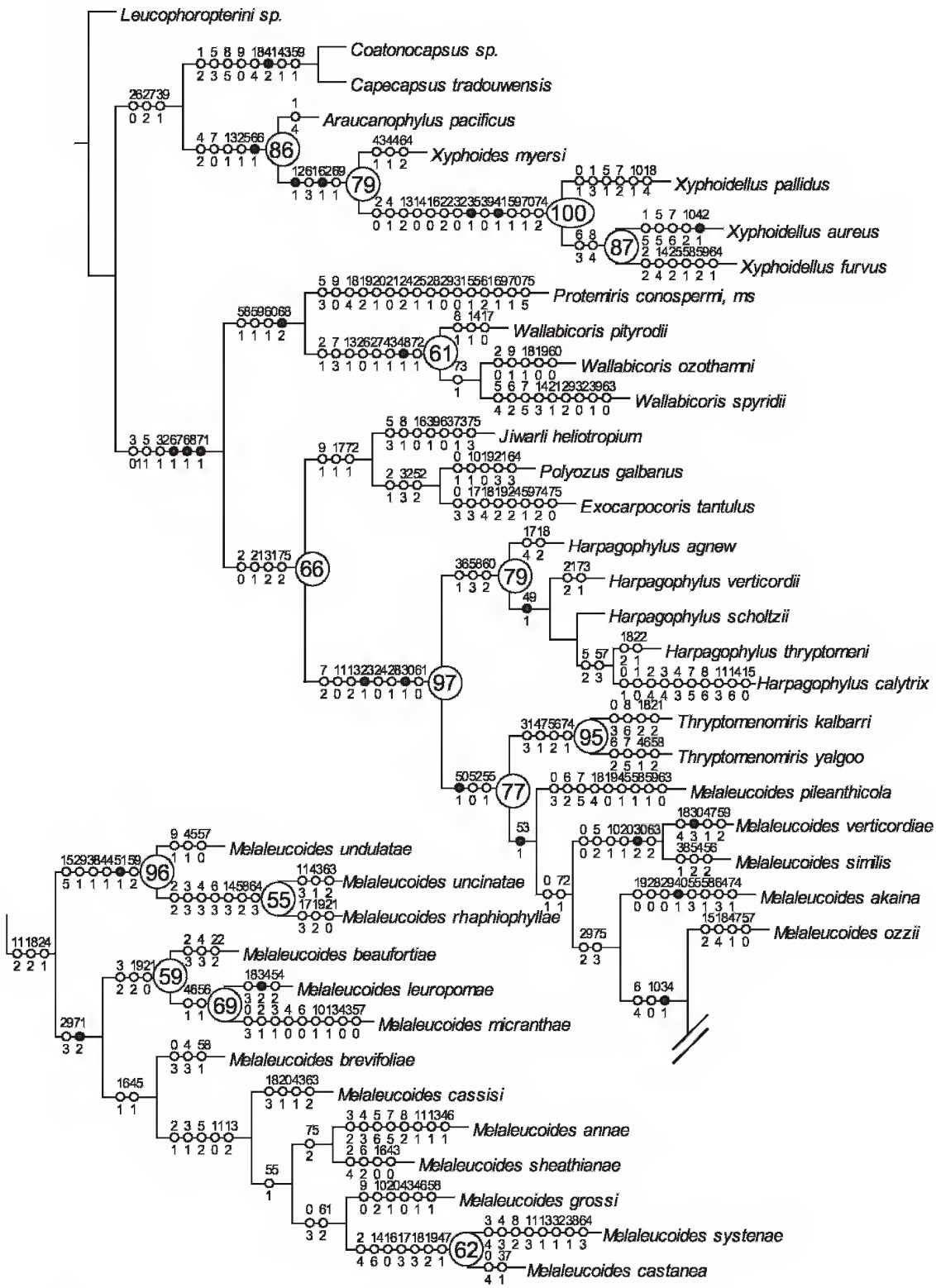


Fig. 36. Phylogenetic relationships within the *Melaleucoides* genus group based on implied weights analysis using TNT and a constant of concavity of 3. Fit = 35.982.

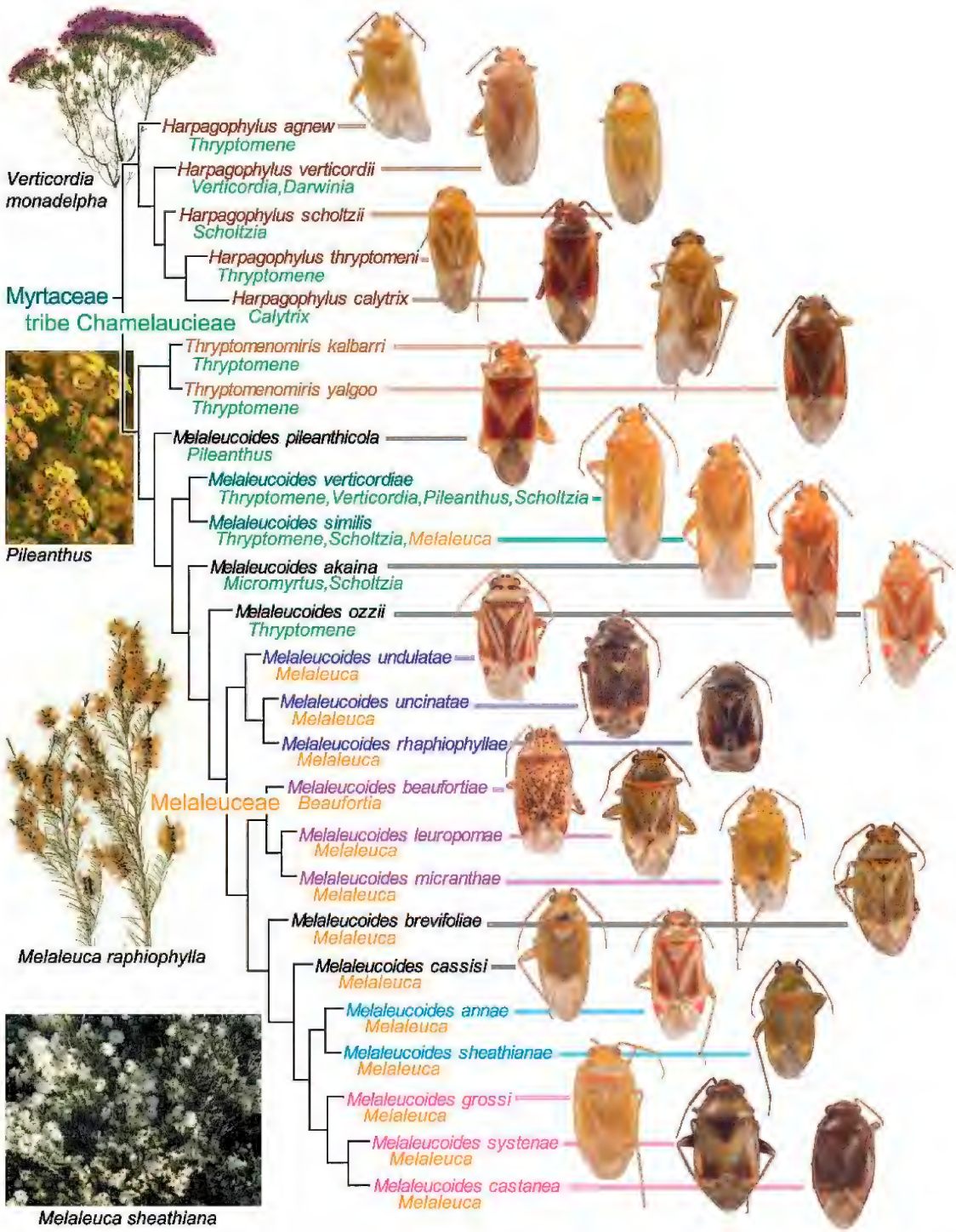


Fig. 37. Host relationships of *Melaleucoides* group plotted on implied-weights phylogenetic analysis in figure 36.

TABLE 2
Hosts of *Melaleucoides* genus group species

Host genus and species	No. of Specs.	Locality	Miridae species
Beaufortia micrantha	39	WA: Fitzgerald River National Park, Hammersley Road	*M. beaufortiae*
Beaufortia micrantha micrantha	25	WA: 92.5 km W of Coolgardie at east side of Boorabbin National Park on Great Eastern Hwy	*M. micranthae*
Calytrix glutinosa	71	WA: 11 km S of Eneabba, Eneabba National Park	*M. verticordiae*
Calytrix variabilis (pl. 5A)	10	WA: Kalbarri National Park, Meanarra Hill	*H. calyrtrix*
Darwinia diosmoides	8	WA: Kalbarri National Park, Loop Road	*T. yalgoo*
Malleostemon hursthousei	1	WA: ca. 1 km S of Murchison House HS, Kalbarri National Park	*T. kalbarri*
Melaleuca brevifolia	57	SA: Scorpion Springs Cons. Park	*M. brevifoliae*
Melaleuca conothamnoides	7	WA: 15 km E of Merredin	*M. leuropomae;*
	2	WA: 15 km E of Merredin	*M. similis*
Melaleuca laetifica (pl. 5A)	30	WA: Kalbarri National Park, 37.7 km E Kalbarri	*M. systenae*
Melaleuca leuropoma (pl. 5C)	29	WA: Kalbarri National Park, 7 km E of Kalbarri	*M. leuropomae*
Melaleuca megacephala	19	WA: Kalbarri National Park, Loop Road	*M. verticordiae*
Melaleuca rhaphiophylla (pl. 5D)	11	WA: Brand Hiway 8.2 km N of Eneabba	*M. rhaphiophyllae*
	1	WA: Brand Hiway 8.2 km N of Eneabba	*M. uncinatae*
Melaleuca sheathiana (pl. 6A–C))	186	WA: 11 km N of Coolgardie-Esperance Hiway on Kambalda Road	*M. annae*
	100	WA: 11 km N of Coolgardie-Esperance Hiway on Kambalda Road; 33.3 km S of Norseman	*M. sheathianae*
Melaleuca sp.	2	WA: Moorine Rocks, 11.7 km N of Great Eastern Hiway on Noongar Road	*M. rhaphiophyllae*
Melaleuca sp.	2	WA: Frank Hann National Park, 37 km E of Lake King	*M. systenae*
Melaleuca systena	22	WA: 4.5 km S of Jurien on Indian Ocean Rd; WA: 8.2 km E of Indian Ocean Rd on Coorow-Greenhead Rd, Lesuer National Park	*M. systenae*
Melaleuca teuthidoides	20	WA: 91.4 km SE of Southern Cross	*M. sheathianae*
Melaleuca uncinata (pl. 6D)	69	WA: 56.6 km W of Yalgoo	*M. uncinatae*
	204	WA: 56.6 km W of Yalgoo	*M. cassisi*
Melaleuca undulata (pl. 6E)	44	WA: Kalbarri National Park, 22.9 km E Kalbarri	*M. undulatae*
	4	WA: 4 km W of Lillian Stoke Rock	*M. castanea*
Melaleuca urceolaris	5	WA: 11 km S of Eneabba on Brand Hiway, Eneabba Reserve	*M. systenae*
Melaleuca viminea	4	WA: Cervantes	*M. leuropomae*; *M. systenae*
Micromyrtus hursthousei (pl. 7A)	11	WA: NW Coastal Hiway 58 km N of Kalbarri Road	*M. akaina*
Phymatocarpus porphyrocephalus	5	WA: Brand Hiway 45.9 km S of Dongarra Road	*M. leuropomae*;
	5	WA: Brand Hiway 45.9 km S of Dongarra Road	*M. systenae*
Pileanthus peduncularis borealis (pl. 7B)	102	WA: Kalbarri National Park, Loop Road; Kalbarri National Park, Z-Bend Road; NW Coastal Hiway 57 km N of Kalbarri Road	*M. verticordiae*
	128	WA: Kalbarri National Park, Loop RoaD; NW Coastal Hiway 57 km N of Kalbarri Road	*M. pileanthicola*

TABLE 2
(Continued)

Host genus and species	No. of Specs.	Locality	Miridae species
Pileanthus peduncularis subsp. pilifer (pl. 7D)	3	WA: 66.2 km E of North West Coastal Hiway on Mardathuna Rd	*M. pileanthicola*
Pileanthus vernicosus	59	WA: 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area); WA: ca. 1 km S of Murchison House HS, Kalbarri National Park	*M. verticordiae*
		WA: 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area)	*M. pileanthicola*
Scholtzia drummondii	5	WA: Brand Hiway 55.9 km S of Dongarra Road	*M. verticordiae*
(pl. 8A)	1	WA: 11 km S of Eneabba, Eneabba National Park	*M. similis*
Scholtzia leptantha	11	WA: 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon	*M. akaina*
	1	WA: 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon	*M. pileanthicola*
	8	WA: 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon	*H. scholtzii*
Thryptomene aspera aspera (pl. 8B)	6	WA: 28 km S of Menzies (3.5 km E of Hiway)	*M. pileanthicola*
	23	WA: 28 km S of Menzies (3.5 km E of Hiway)	*H. thryptomeni*
Thryptomene aspera glabra	47	WA: 24 km W of Sandstone	*M. verticordiae*
	2	WA: 24 km W of Sandstone	*M. similis*
	30	WA: 24 km W of Sandstone; WA: 46.5 km W of Yalgoo	*T. yalgoo*
	20	WA: 31.7 km W of Agnew toward Sandstone	*H. agnew*
Thryptomene kochii	21	WA: 135 km W of Coolgardie on Great Eastern Hiway	*Melaleucoidea ozzii*
Thryptomene sp.	46	WA: Kalbarri National Park, Loop Road	*T. kalbarri*
Verticordia capillaris	19	WA: 54.3 km N of jct of Agana Kalbarri Rd and Brand Hiway (rest area)	*M. verticordiae*
Verticordia chrysantha (pl. 8C, D)	421	WA: 1 km S of Lillian Stoke Rock; 11 km S of Eneabba, Eneabba National Park; 123 km W of Coolgardie on Great Eastern Hiway; 20.6 km S of Norseman-Lake King Road on Lake King-Cascades Road; 3.5 km E of Lillian Stoke Rock; Eneabba on Brand Hiway	*M. verticordiae*
	1	WA: 1 km S of Lillian Stoke Rock	*M. systenae*
Verticordia chrysanthella	53	WA: 11 km S of Eneabba, Eneabba National Park	*M. verticordiae*
Verticordia densiflora	71	WA: Eneabba on Brand Hiway	*M. verticordiae*
Verticordia forrestii	5	WA: North West Coast Hiway 72 km NE of jct with Blowholes Rd	*H. verticordii*
Verticordia monadelpha (pl. 9A)	24	WA: Kalbarri National Park, Loop Road	*H. verticordii*
Verticordia polytricha	69	WA: Kalbarri National Park, Loop Road	*M. verticordiae*
(pl. 9B)	26	WA: Kalbarri National Park, Loop Road	*H. verticordii*
Verticordia roei	4	WA: 3.5 km E of Lillian Stoke Rock	*M. verticordiae*

the monophyly of the group is nonetheless strongly supported in our analyses; the form of the right paramere (60-2) is easily recognized. The monophyletic group combining *Thryptomenomiris* and *Melaleucoides* is diagnosed by three characters, the most obvious of which is the vertical orientation of the left paramere (50-1). Under our character codings

none of the characters diagnostic for *Thryptomenomiris* is unique, but the monophyly of the group is nonetheless strongly supported in our analyses; the form of the left paramere (56-2) is the most easily recognized. The monophyly of *Melaleucoides* is recognized by the left paramere extending vertically to the dorsal margin of the pygophore (53-1), a feature seen nowhere else in the Phylinae.

Although the form of the left paramere in *Melaleucoides* shows great consistency across the group, the structure of the endosoma is rather variable. Most species of *Melaleucoides* have two long apical spines and at least one additional spine associated with the secondary gonopore. Novel within the group is *M. akaina*, which has a single, short, apical spine and no processes associated with the secondary gonopore. Nonetheless, all of our phylogenetic analyses place *M. akaina* within *Melaleucoides* because of the structure of the parempodia and the left paramere.

The tree topologies resulting from our analyses differ with respect to certain species-level relationships within *Harpagophylus* and *Melaleucoides*. Among the clades within *Melaleucoides* recovered in both analyses are, e.g., a clade that comprises *M. undulatae*, *M. rhaphiophyllae*, and *M. uncinatae* and a clade that consists of *M. beaufortiae*, *M. leuropomae*, and *M. micranthae*.

HOST RELATIONSHIPS

All species in the *Melaleucoides* genus group are associated with plant species in the family Myrtaceae, subfamily Myrtoideae sensu Wilson et al. (2005) (table 2; fig. 37). The majority of plant bug species were recorded from one or very few host plant species (table 2). A noteworthy exception is *M. verticordiae*, the most commonly collected species in the genus group (976 specimens), which was recorded from 13 plant species comprising a wide range of Myrtaceae. Several plant species harbored more than one species of plant bug in the *Melaleucoides* genus group, among them *Melaleuca rhaphiophylla*, *Melaleuca viminea*, and *Verticordia polytricha* (table 2).

The *Melaleucoides* genus group appears to have a relatively clear-cut evolutionary pattern of host associations within the family Myrtaceae. According to Wilson et al. (2005), 15 tribes are currently recognized in this subfamily including the Melaleuceae (e.g., *Melaleuca*, *Callistemon*), Leptospermeae (e.g., *Kunzea*, *Agonis*), and Chamelaucieae (e.g., *Verticordia*, *Thryptomene*), all of which are speciose in Australia. The phylogenetic analyses by Wilson et al. (2001, 2005) demonstrated that Chamelaucieae and Leptospermeae are sister taxa and that Melaleuceae are more distantly related to that clade; species in the *Melaleucoides* genus group occur on species in the Chamelaucieae and Melaleuceae. *Harpagophylus* spp. and *Thryptomenomiris* spp. are restricted to Chamelaucieae and *Melaleucoides* spp. are known to be associated with both tribes. We mapped host genera on the implied weights tree and the following pattern appears: the association with species in the Chamelaucieae is the ancestral host association for the genus group and is seen in *Harpagophylus*, *Thrpytomenomris*, and the basal taxa within *Melaleucoides* (fig. 37) representing five species. Within the genus *Melaleucoides* a host switch occurred to the Melaleuceae, specifically species of *Melaleuca* and *Beaufortia*, and the 12 remaining species of *Melaleucoides* for which host plants are known are restricted to these two genera.

DISTRIBUTIONAL PATTERNS

Twenty-three of the 25 species placed in the *Melaleucoides* genus group are known only from a limited region in southwestern Western Australia; these distributions are shown in maps 1–6. The other two are known from the southeastern costal region of South Australia, as shown in maps 3 and 4. One might conclude that this distribution is the result of sampling bias. On the contrary, G. Cassis, R.T. Schuh, and their colleagues have collected over a wide area of Australia, using techniques similar to those applied in the capture of members of the *Melalecoides* genus group. And they have captured many other species of Phylinae breeding on species of Myrtoideae as part of those efforts. Thus, we conclude that these restrictions to the western part of the continent are not an artifact, but represent a real aspect of the distribution of this lineage.

Because we do not have a broader sampling of phylogenetic relationships for Australian Phylinae, it is not possible to specify the distribution of the sister group of the *Melaleucoides* genus group. Nonetheless, the distribution of the *Melaleucoides* group species has great similarity with distributions seen in monophyletic species groups within the recently described genus *Wallabicoris* (Schuh and Pedraza, 2010). No meaningful biogeographic statements can be made on the basis of two presumed areas of endemism as seen in the *Melalecoides* genus group (SW, SE). Correspondence with broader biogeographic theories will have to await improved knowledge of phylogenetic relationships within the Australian Phylinae.

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APPENDIX 1
Data Matrix And Character Descriptions

	0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75
Leucophoropterini sp.	0033300122330-4201300200102000-02--0000000-00000000010000000010201000000001
Coatonocapsus sp.	0243330450020061124102001002030--000000102-10000000010000101010201000000004
Capecapsus tradouwensis	0243330450020061124102001002030--000000102-10000000010000101010201000000004
Wallabicoris ozothamni	1300110301010-0212100210100101011--0000000-10000100020000111010201012001l1-4
Wallabicoris pityrodii	1311110312020111102102101001010l1--0000000-10000100030000111110201012001l024
Wallabicoris spyridii	2311142502020131123101101001020l0--0000100-10000100010000111110001012001l1-4
Xyphoides myersi	2043200002331163123103101102030l2--0000100-11000000010000020031121100l000004
Araucanophylus pacificus	2443200002330161123203101102020----0000100-00000000010000120010200l000000004
Xyphoidellus aureus	2502153641241204023202201102030l0--1000001100000000010000001031200l001100024
Xyphoidellus furvus	2022103041341244023202201202030l0--1000001000000000010000012031201001100024
Xyphoidellus pallidus	1300110200101204024201201102030l0--1000001000000000010000001031100l001100024
Jiwarli heliotropium	2302330411010003013101201020020210--0000100-00000000010000200010001011001l1-3
Polyozus galbanus	1611310701120001113003101020030231000200l0-00000000020000020010231011001l002
Exocarpocoris tantulus	3611310801020001134201?020200302310001000l-00000000020000011010201011001l020
Protemiris conospermi, ms	2140130400310002124210002120100010000000l0-00000000300100111201010121110005
Harpagophylus agnew	2600110202000202142011210020131210-00110000-10000000010000130200l0----------
Harpagophylus calytrix	1044320562530260123011210020131210-00110000-2----0100100003302101O----------
Harpagophylus scholtzii	2600110202500202133011210020131210-00110000-20---0100100001302001O----------
Harpagophylus thryptomeni	2600120202500202132111110020131210-00110000-2000001001000033O 1010110010002
Harpagophylus verticordii	2600110202500202123102210020131210-00120000-2000001001000013020010101100101-2
Thryptomenomiris kalbarri	3600110262500200122102110020131l--00020000-0000100100021200000010101100l0012
Thryptomenomiris yalgoo	2600112502500202123101210020131l--00020000-0001100100021202000001010110010012
Melaleucoides akaina	161111030250020--2300121002000122000000010-0001000100113011000013101100l1013
Melaleucoides annae	2612364522010100142101111020131230100201l0-2011000100111010000010101100210002
Melaleucoides beaufortiae	2732336442020000022200211020131230100001l0-2000000100112012000001010110021003
Melaleucoides brevifoliae	3300336452020000122101111O----------2010000100112011000010----------
Melaleucoides cassisi	2611124202500200143111111020131230100201l0-1010000100112010000020101100210003
Melaleucoides castanea	4041100002500260033201111020131230100101l0-2010100100111010002000----------
Melaleucoides grossi	3611124200200200142111111020131230100201l0-0011000100111011002000----------
Melaleucoides leuropomae	2302136442020000033200111020131230200201l0-2001000100122110000010101100210003
Melaleucoides micranthae	3311030442120100042200111020131230100201l0-0001000100112102000010----------
Melaleucoides ozzii	1600144622000102014101110020121230101001l0-2001100100111000000010----------
Melaleucoides pileanthicola	3600112502500200114001110020131230000101l0-2010000100111011100000101100l0002
Melaleucoides rhaphiophyllae	1023303122020035032200111O----------2100000110110012200013----------
Melaleucoides sheathianae	2641122202500200042101111020131230100201l0-0010000100111010000010101100210002
Melaleucoides similis	0611120202100200023111210020132210001211l0-2000000100121210000020----------
Melaleucoides systenae	3244375-2203016003320111102013121--0021100-2010100100111010002013101100210003
Melaleucoides uncinatae	1023303122030035042101111020111121--0201000-1100000110111012200023101100l1003
Melaleucoides undulatae	2700164941020005042101111020111121--0101000-2110000110110000200010----------
Melaleucoides verticordiae	0611120202100200114111210020133210001200l0-0000100100111010200020101100l1002

Character Descriptions

0. **Body**: Greatly elongate, parallel sided = 0; moderately elongate, parallel sided = 1; weakly elongate, weakly ovoid = 2; weakly to distinctly ovoid = 3; broadly ovoid = 4. [additive]

COLORATION

1. **Head**: Uniformly dark = 0; pale with dark clypeus = 1; mostly dark with pale gula and posterior head margin = 2; pale or pale with red or dark dots = 3; dark with pale mark at medial eye margin = 4; Pale with red suffusion on gena = 5; Uniformly pale = 6; Pale, clypeus dark and large dark bilateral markings on frons = 7. [nonadditive]
2. **Scapus**: Unicolorous pale = 0; yellow to dirty yellow = 1; brown = 2; pale with a dark base = 3; unicolorous dark = 4. [nonadditive]
3. **Pedicellus**: Unicolorous pale = 0; yellow to dirty yellow = 1; dirty yellow proximally, weakly to heavily infuscate distally = 2; unicolorous black or castaneous = 3; black at extreme base, remainder pale = 4. [nonadditive]
4. **Labium**: Uniformly pale = 0; pale with segment 4 heavily infuscate = 1; unicolorous red = 2; generally infuscate, heavily so apically = 3. [nonadditive]
5. **Thorax**: Pronotum: Unicolorous deep red to black = 0; unicolorous pale = 1; unicolorous (yellow, brown, or green) = 2; pale with brown spots = 3; pale with red or carmine blotches = 4; pale with orange tinge, anterior lobe cream with dark marks = 5; pale with castaneous cali and humeri = 6; usually with dark anterior lobe and contrasting posterior lobe = 7. [nonadditive]
6. **Scutellum**: Unicolorous with remainder of dorsum = 0; with some red or carmine spots or blotches on pale background = 1; entirely red or orange = 2; red or dark brown with white or pale tip = 3; white = 4; entirely dark = 5; pale with brown spots = 6. [nonadditive]
7. **Hemelytron**: Unicolorous, deep red to black = 0; castaneous to black with contrasting white markings = 1; unicolorous [pale, white, or yellow] = 2; mostly pale, or yellow, endocorium with dirty or golden areas = 3; unicolorous pale with small brown spots = 4; with red or carmine spots, botches, or solid areas = 5; pale yellow with red suffusion = 6; brown with white cuneus = 7; with pattern of yellow, brown, and white, cuneus white = 8; pale with longitudinal castaneous stripes = 9. [nonadditive]
8. **Markings on cuneus**: Absent = 0; present as partial or complete but weak infuscation = 1; present as a contrasting white basal fascia = 2; present as pale narrow band, red over remaining area = 3; present as a red or castaneous apex = 4; present as small dark dots = 5; absent, cuneus transparent = 6. [nonadditive]
9. **Membrane**: Unicolorous pale = 0; partially fumose = 1; weakly to strongly fumose over entire area = 2. [nonadditive]
10. **Membrane veins**: White or pale = 0; yellow = 1; entirely red = 2; dark or dark red = 3; pale with distal portion of anterior cell red = 4; unicolorous with membrane = 5. [nonadditive]
11. **Hind femur**: Unicolorous pale, without black spots = 0; with a few brown or black spots = 1; with many brown or black spots = 2; nearly unicolorous dark = 3; pale with distal red suffusion = 4. [nonadditive]
12. **Hind tibial spines**: Dark = 0; pale = 1.
13. **Hind tibial spines (bases)**: With conspicuous dark spots at bases = 0; with very small dark bases = 1; without dark spots at bases = 2. [nonadditive]
14. **Abdominal venter**: Unicolorous pale or mostly so = 0; light green = 1; light yellow = 2; heavily red laterally = 3; heavily infuscate, at least on mesopleuron and abdomen = 4; with thorax pale and abdomen dark = 5; unicolorous dark = 6. [nonadditive]

SURFACE AND VESTITURE

15. **Dorsal common setae**: With erect, suberect, or reclining black setae = 0; with black setae intermixed with pale setae on hemelytra = 1; with reclining simple setae matching background coloration = 2; with subadpressed flattened and erect simple pale setae = 3; with simple pale suberect setae = 4; with golden reclining setae = 5. [nonadditive]
16. **Dorsal woolly setae**: Without sericeous or woolly setae = 0; with some sericeous or woolly setae = 1.

STRUCTURE

17. **Head**: Elongate, projecting anteriorly = 0; moderately projecting = 1; somewhat projecting = 2; weakly projecting = 3; barely projecting, = 4. [nonadditive]
18. **Interocular space**: Relatively small = 1; moderate = 2; relatively large = 3; large = 4. [additive]

19. **Eyes**: Leaving gena only very slightly exposed in lateral view = 0; leaving gena moderately exposed in lateral view = 1; leaving gena broadly exposed in lateral view = 2. [additive]
20. **Antenna**: Segment 2: weakly tapering, more slender at base = 0; of equal diameter over entire length = 1.
21. **Antennal fossa**: With dorsal margin somewhat below ventral margin of eye = 0; with ventral margin at ventral margin of eye = 1; with ventral margin 1 diameter above ventral margin of eye = 2; with ventral margin 2 diameters above ventral margin of eye = 3. [nonadditive]
22. **Labium**: Reaching to posterior margin of mesosternum = 0; just reaching onto abdomen = 1; reaching to about anterior margin of pygophore = 2. [additive]
23. **Paremopodia**: Setiform = 0; fleshy, recurved. lyriform = 1.
24. **Pulvilli**: Absent = 0; present, flaplike, covering about one third of ventral claw surface = 1; present, flaplike, covering most of ventral surface of claw = 2. [additive]
25. **Pygophore**: Without row or tuft of setae on left side = 0; with dense tuft of setae on left side = 1; with double row of setae on left side = 2. [nonadditive]
26. **Endosoma base**: Very long = 0; moderately long = 1; short = 2. [nonadditive]
27. **Endosoma shape**: Curving, often C- or J-shaped = 0; with a U-shaped bend = 1; forming a single complete coil = 2. [additive]
28. **Endosoma body**: With torsion, primary strap dorsal to secondary gonopore = 0; without torsion, primary strap ventral to secondary gonopore = 1.
29. **Primary endosomal strap apically**: Short, ratio length apex strap/length secondary gonopore 1.33–1.50 = 0; weakly elongate, length apex strap/length secondary gonopore 1.67–2.00 = 1; elongate, ratio length apex strap/length secondary gonopore 2.15–2.83 = 2; greatly elongate, length apex strap/length secondary gonopore 3.00–8.6 = 3. [additive]
30. **Primary endosoma strap apically (2)**: At least weakly arcuate and curving ventrally = 0; at least weakly arcuate and curving dorsally, no ornamentation = 1; at least weakly arcuate and curving dorsally, denticulate margin = 2; at least weakly arcuate and curving dorsally, comblike margin = 3. [additive]
31. **Secondary endosomal strap**: Broad, about equal in width to primary strap = 0; very slender, of uniform width from vesical bend to gonopore = 1; fused with primary strap = 2; absent = 3. [additive]
32. **Secondary endosoma strap (2)**: Reaching midway to gonopore from major bend in vesica = 0; reaching to level of secondary gonopore = 1; reaching just beyond secondary gonopore as fingerlike extension = 2; reaching well beyond gonopore = 3. [nonadditive]
33. **Secondary endosomal strap (3)**: With one tip = 0; anchor shaped = 1.
34. **Secondary endosomal strap (4)**: Devoid of ornamentation = 0; with denticles = 1; with a comblike edge = 2. [additive]
35. **Fingerlike protuberance at distal margin of secondary gonopore**: Absent = 0; present = 1.
36. **Spinelike, elongate process arising near gonopore on dorsal surface**: Absent = 0; present, erect, unornamented = 1; present, erect, ornamented with denticles = 2. [additive]
37. **Spinelike, elongate process near gonopore on ventral surface**: Absent = 0; present and erect = 1; present, recurved toward base of endosoma = 2. [nonadditive]
38. **Bladderlike process distad of secondary gonopore**: Absent = 0; present = 1.
39. **Secondary gonopore**: Seen laterally in lateral view of vesica = 0; seen frontally (facing up) in lateral view of vesica = 1.
40. **Secondary gonopore (2)**: Without a denticulate ridge on right-hand surface of endosoma = 0; with a denticulate ridge on right-hand surface of endosoma = 1.
41. **Secondary gonopore sclerite (1)**: Absent = 0; present = 1; absent, but short, slender sclerite close to gonopore = 2. [nonadditive]
42. **Secondary gonopore sclerite (2)**: Separated from secondary endosomal strap at apex = 0; apparently fused to secondary endosomal strap at apex = 1.
43. **Phallotheca**: Smoothly curving on dorsal margin = 0; more or less right angulate = 1; nearly erect = 2. [nonadditive]
44. **Dorsal surface of phallotheca**: Without a fingerlike projection = 0; with a fingerlike projection = 1.
45. Dorsal surface of phallotheca (2): Without a platelike projection = 0; with a curving, posteriorly directed, platelike projection = 1.
46. **Anterior surface of phallotheca**: Without a keel = 0; with a short to elongate keel = 1.
47. **Ventral surface of phallotheca**: Without a projecting keel = 0; with a projecting keel = 1.
48. **Posterior surface of phallotheca**: Lacking transparent window = 0; with conspicuous transparent window = 1.

49. **Apex of phallotheca**: Simple = 0; complex = 1.
50. **Left Paramere**: Horizontal = 0; vertical = 1.
51. **Left paramere shaft**: At right angles to body = 0; in same axis as body = 1.
52. **Left paramere in dorsal perspective**: Not exceeding margin of pygophore = 0; just exceeding margin of pygophore = 1; somewhat exceeding pygophore margin = 2; greatly exceeding margin of pygophore = 3. [nonadditive]
53. **Left paramere in lateral perspective**: Covering limited extent of lateral surface of pygophore = 0; erect and reaching dorsal margin of pygophore or beyond = 1.
54. **Left paramere body**: Narrowed toward apex = 0; spoon shaped = 1; more or less quadrate = 2. [nonadditive]
55. **Left paramere apex medially**: Angulate = 0; broadly rounded to weakly quadrate = 1; drawn into a blunt fingerlike process = 2; with an elongate, acuminate, recurved medial process = 3. [nonadditive]
56. **Left paramere apex posterolaterally**: Simple = 0; with a low shoulder = 1; with a greatly elongate projection = 2. [additive]
57. **Left paramere anterior process**: Slender and cylindrical in lateral view = 0; triangular in lateral view = 1; broad and elongate in lateral view = 2; undeveloped = 3. [nonadditive]
58. **Left paramere posterior process**: In the form of a short, straight, fingerlike projection = 0; in the form of a long, straight, fingerlike projection = 1; in the form of a short curved fingerlike projection = 2; very long, curving 90° toward base of paramere = 3. [nonadditive]
59. **Left paramere base of posterior process**: Without conspicuous shoulder = 0; with slightly projecting shoulder = 1; with distinct shoulder = 2. [nonadditive]
60. **Right paramere body**: Short and broad, lanceolate = 0; moderately elongate = 1; greatly elongate, bulbous at base = 2. [nonadditive]
61. **Right paramere apex**: Short, clawlike, decurved = 0; tapered and acuminate = 1; with short fingerlike process = 2; with a very long fingerlike process = 3. [nonadditive]
62. **Right paramere posterior margin of apex**: Smooth = 0; with distinct serration = 1.

FEMALE

63. **Body shape**: As in male = 0; slightly more ovoid than male = 1; distinctly more ovoid than male = 2. [additive]
64. **Coloration**: As in male = 0; more vividly red than male = 1; as in male but with cuneus bright red = 2; paler than male = 3. [nonadditive]
65. **Posterior wall laterally**: Without interramal sclerites = 0; with distinct crescent-shaped interramal sclerites = 1.
66. **Posterior wall posteriorly**: Without a sclerotized transverse band = 0; with a sclerotized transverse band = 1.
67. **Posterior wall posterolaterally**: Without a distinct swelling covered with microtrichia = 0; with a distinct swelling covered with microtrichia = 1.
68. **Posterior wall longitudinal midline**: Undifferentiated = 0; fold on either side of midline along part of length = 1; fold on either side of midline along most of length = 2. [additive]
69. **Posterior wall posterior margin**: Without spicules = 0; ornamented with spicules = 1.
70. **Posterial wall posterior margin (2)**: Not reflexed dorsally = 0; reflexed dorsally = 1.
71. **Posterior wall interramal lobes**: Absent = 0; present and roughly symmetrical, erect = 1; present and asymmetrical, reclining, overlapping = 2. [additive]
72. **Posterior wall interramal lobes (2)**: Not ornamented with spicules or with a very few = 0; heavily ornamented with spicules = 1.
73. **Vestibulum medial plates (1)**: Sclerotized and readily observed = 0; weakly sclerotized or apparently absent = 1.
74. **Vestibulum medial plates (2)**: Small, nearly symmetrical, triangular = 0; large, nearly symmetrical = 1; right plate larger, more strongly elongate than left = 2. [nonadditive]
75. **Vestibulum medial plates sclerotized guide structure**: Absent = 0; present as short weakly sclerotized medial tube = 1; present as caplike structure with internal differentiation = 2; present as short, heavily sclerotized tube on left side = 3; present as long tube on left side doubling back = 4; present as lateral sclerotizations = 5. [nonadditive]

PLATES

Plate 1. Habitus images of *Harpagophylus* spp., *Thryptomenomiris* spp., and *Melaleucoides akaina*, and *M. annae*.

Plate 2. Habitus images of *Melaleucoides beaufortiae–Melaleucoides leuropomae*.

Plate 3. Habitus images of *Melaleucoides micranthae–Melaleucoides similis*.

Plate 4. Habitus images of *Melaleucoides systenae–Melaleucoides verticordiae*.

Plate 5. Host plants of *Melaleucoides* genus group taxa. **A.** *Calytrix variabilis* Lindl. **B.** *Melaleuca laetifica* L.A. Carven. **C.** *Melaleuca leuropomae* L.A. Craven. **D.** *Melaleuca rhaphiophylla* Schauer.

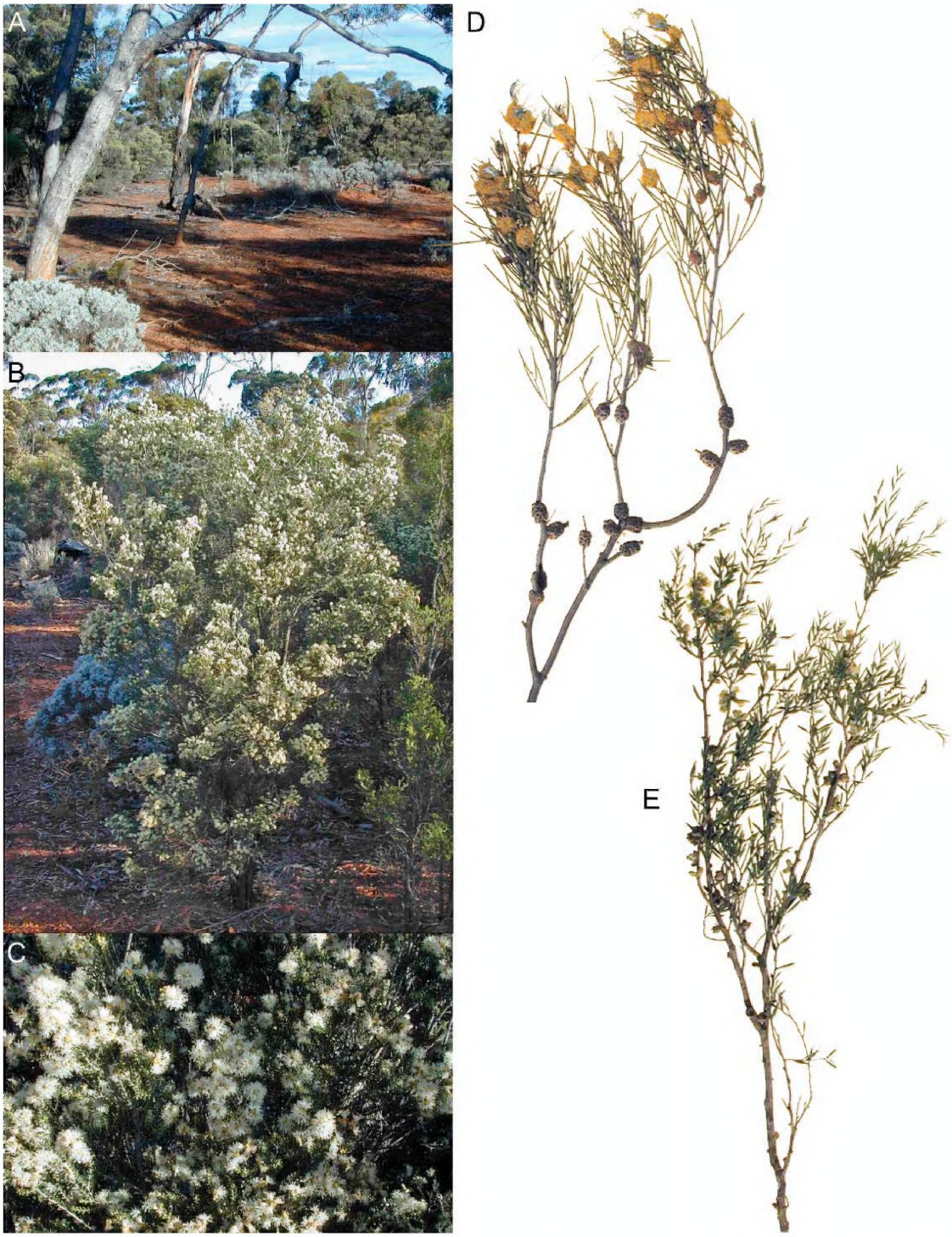

Plate 6. Host plants of *Melaleucoides* genus group taxa. **A.–C.** *Melaleuca sheathiana* W. Fitz. **D.** *Melaleuca uncinata* R. Br. **E.** *Melaleuca undulata* Benth.

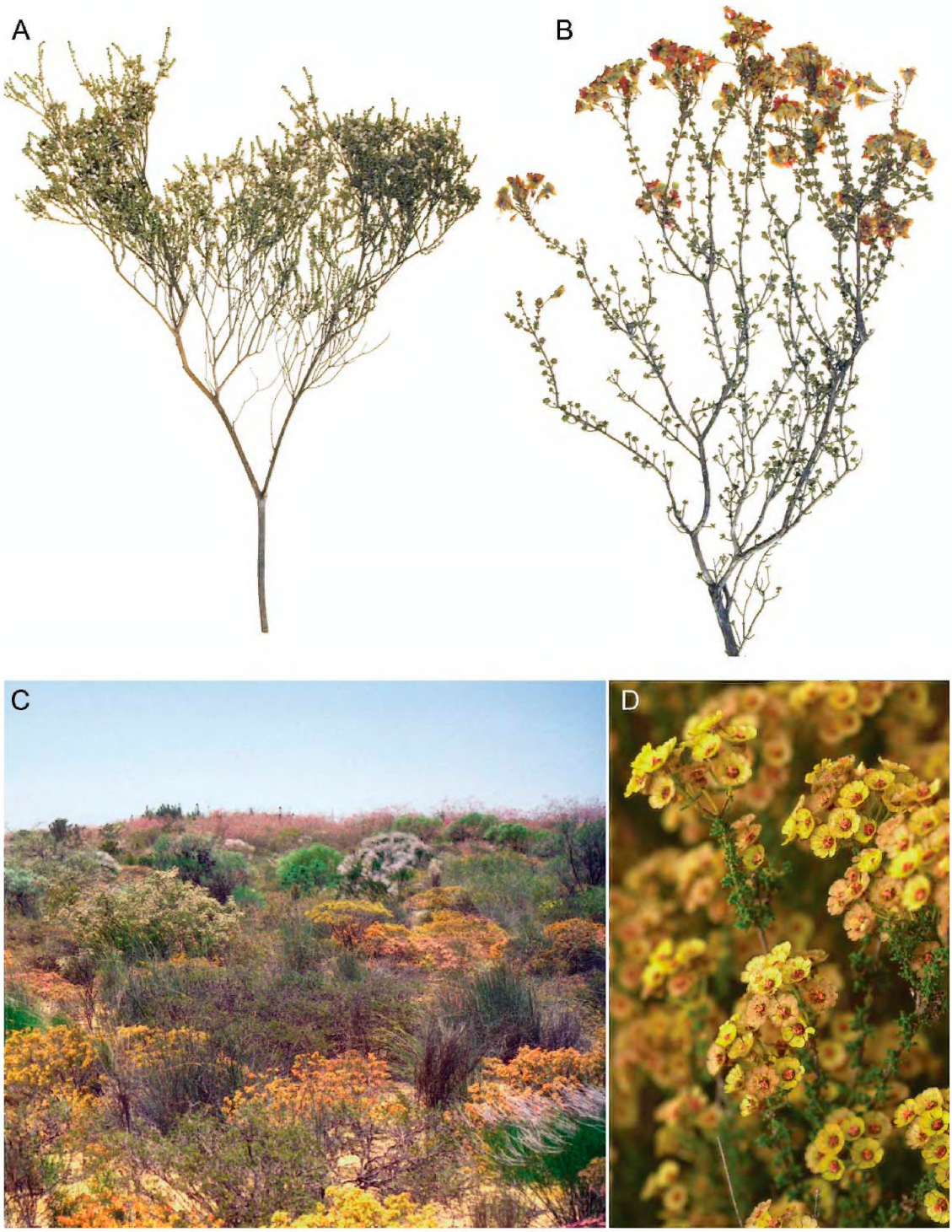

Plate 7. Host plants of *Melaleucoides* genus group taxa. **A.** *Micromyrtus hursthousei* W. Fitz. **B.** *Pileanthus peduncularis borealis* Endl. **C.** *Pileanthus* spp. (foreground). **D.** *Pileanthus peduncularis pilifer* Keighery.

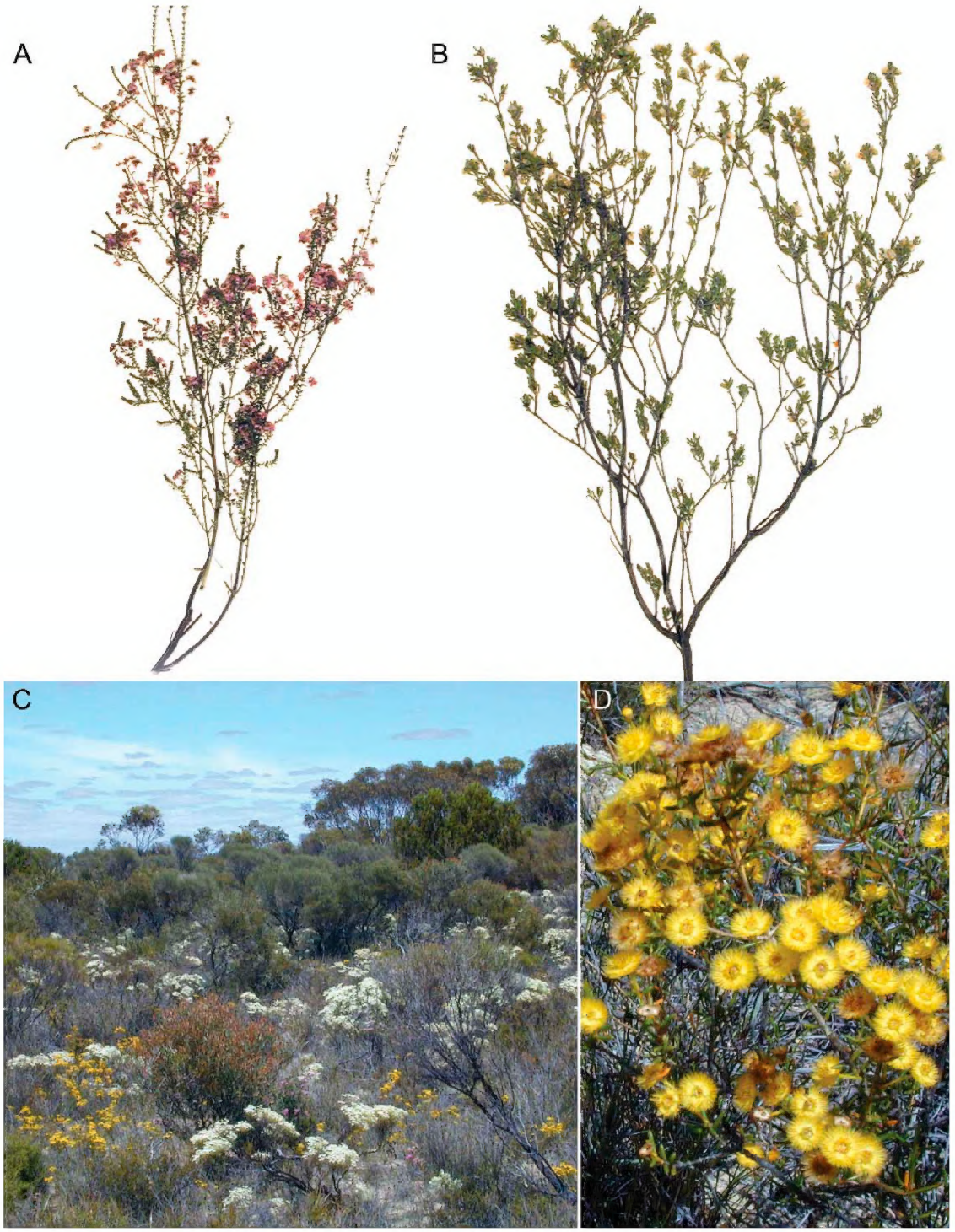

Plate 8. Host plants of *Melaleucoides* genus group taxa. **A.** *Scholtzia drummondii* Benth. **B.** *Thryptomene aspera aspera* E. Pritz. **C–D.** *Verticordia chrysantha* Endl.

Plate 9. Host plants of *Melaleucoides* genus group taxa. **A.** *Verticordia monadelpha* Turcz. **B.** *Verticordia polytrichia* Benth.